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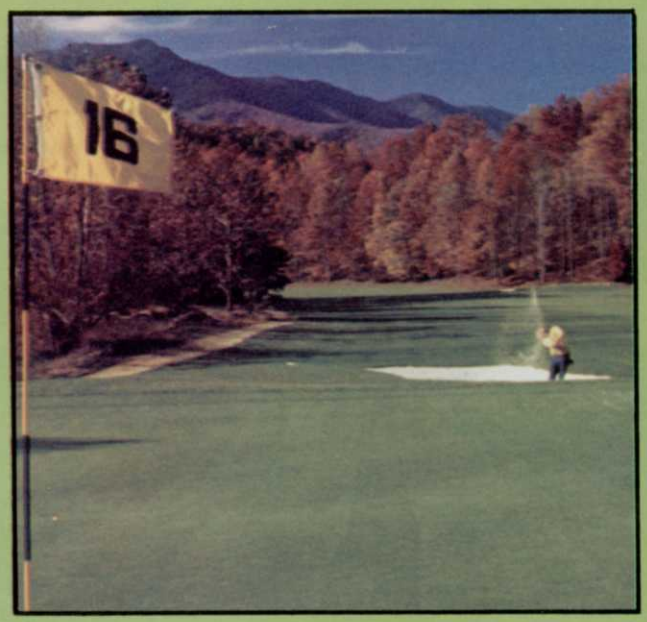

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Cover: Devil's Elbow Golf Course, adjacent to Hilton Head.

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OUTLOOK

By Bruce F. Shank, Editor

The importance of industry conferences to the landscape businessman should be clear this winter. Dealing with inflation is no simple matter. Conferences and industry publications have become as necessary as a good accountant in today's challenging business climate.

Prices, inventories, salaries, insurance rates, marketing, depreciation, and many other business facts of life must be watched daily, not just at budget review time. The importance of these items is obvious. What may not be obvious is the waste caused by improper use of materials and methods. Conferences, although sometimes repetitious in subject matter, refresh our memories in both areas of savings.

It might be a good idea for those lucky enough to attend conferences to pass on what they have learned to all others in their company. It is the person who performs these functions that needs the refresher most, and they probably aren't the ones you took with you to the show. Going to conferences is not cheap and the real economy comes from spreading the information from the one who attended to those who did not.

In case you miss a good session at any particular conference that you feel would help your company, write me and we'll contact the author for publication. We can also get other experts on the same subject to contribute to a comprehensive article. Conferences bring out the best. It's up to magazines to capture the best for more permanent reference. Write me with your request at Weeds Trees & Turf, 757 Third Ave., New York, NY 10017.

Now You Can Grade Weeds Trees & Turf

Beginning in March, some of you will have the chance to critique an issue of Weeds Trees & Turf for its interest to you. Called Readex, this research is designed to gauge the reader interest of both advertising and editorial. All departments and features will be graded by readers for their interest, attention holding, and usefulness. Twice a year we will perform this research to check the value of Weeds Trees & Turf to you.

Also, twice a year advertisers get the opportunity to see how effective their advertising is. This lets them know what you think of their product and their advertising. It is feedback needed for magazines, advertisers, and readers to communicate and react to changes in the market.

We welcome your participation in the Readex program. **WTT**

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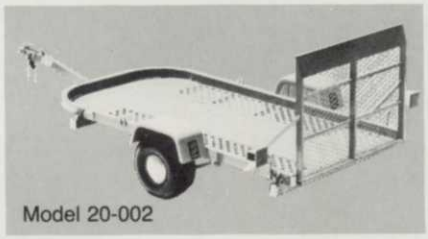
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- New York trial — Merit ranked above Baron, Kenblue and Park.
- Three-year Ohio trial (two locations) — Location # 1, Merit rated above Nugget, Fylking and Kenblue. Location # 2, Merit's ratings superior to Baron, Nugget, Kenblue and Fylking.
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GREEN INDUSTRY NEWS

GREENHOUSE

Texas growers hear cost, energy ideas

The technology exists to save greatly on energy and labor of greenhouse production, according to Dr. Raymond Hasek, environmental horticulturist with the University of California, Davis, who spoke to more than 200 growers at the Texas Greenhouse Growers conference in November.

Efficient use of space through movable benches, increased mechanization, and joining units together with a common wall is already practiced in West Germany and Holland, said Hasek. Different forms of insulation can cut heat loss in half. Double poly covering can save 30 percent on energy costs. Removable blankets can save more than 50 percent. Extra insulation of northern walls, wind breaks, and sealing air leaks can save from 3 to 10 percent each. Regular maintenance of heating units can save up to 20 percent.

Tiers of benches will be common in the future Hasek said. Automation of all material handling will reduce labor costs.

James Irwin, Irwin's Greenhouses, Inc., of Canyon, Texas, told the growers that quality should be emphasized more than price. Since labor represents nearly 60 percent of production cost, any method of efficiency for labor will make the biggest difference. Irwin suggested in-state buying of plants over out-of-state. Space should be considered in terms of cubic feet of production with total utilization of floor and ceiling space. Irwin predicted great innovation in the greenhouse industry within the next few years.

A flying team on the ground. A flight crew from British Airways, who normally pilot a Concorde jet, drove a Simplicity riding mower to victory in the Wisborough Green 12-hour Lawn Mower Endurance Race. The riding mower covered 78 miles during the course of the race to win the class of unmodified production mowers.

INSECTS

Turfgrass symposium hosts 19 entomologists

The latest research from industry, government, and universities on turfgrass insects and their control was presented to a group of 175 turf management specialists in Columbus, OH, in October. This was the second seminar sponsored by the ChemLawn Corporation. The 1979 seminar covered turfgrass pathology.

Nineteen experts discussed up-to-date information on the primary turf pests. Special emphasis was placed on integrated pest management. Proceedings of the seminar will be published as were those of the first symposium, soon available from Weeds Trees & Turf.

ChemLawn has planned the 1981 symposium around turfgrass weed control. This seminar will be held in October. A portion of the program will be devoted to Alternatives to Phenoxy Herbicides. For more information, contact Dr. B.G. Joyner, Plant Diagnostic Lab, 6969 Worthington-Galena Road, Suite L, Worthington, OH 43085.

ARBORISTS

NAA prepares agenda for Sarasota winterfest

A broad variety of topics is planned for the 1981 Annual Meeting of the National Arborist Association, Feb. 15-19, Sarasota Hyatt. The five-day program includes sessions on the spread of the Gypsy moth, use of alternate fuels for vehicles, phermone traps, integrated pest management, and business concerns such as selling and collection, hiring a computer consultant, labor relations, estate planning, and offering lawn care in addition to tree care.

Persons interested in attending the meeting should contact Executive Vice President Bob Felix, National Arborist Association, 3537 Stratford Rd., Wantagh, NY 11793, 516-221-3082.

INTERNATIONAL

British turf groups create national council

Eleven British turfgrass organizations have approved a constitution for the National Turfgrass Council. The new Council has as its objectives to provide a central forum to discuss turfgrass matters, to represent the views of the industry to government departments and other groups, to reinforce training and education within the industry, to help generate new research, and to promote the industry in general.

Organizations participating in the Council are the Association of Playing Fields Officers and Landscape Managers, British Agrochemicals Association, British Association of Golf Course Architects, British Golf Greenkeepers' Association, British Lawnmower Manufacturers' Federation, British Turf Irrigation Association, Institute of Groundsmanship, Institute of Park and Recreation Administration, Joint Council for Landscape Industries, Sports Research Institute, and the United Kingdom Agricultural Supply Trade Association Ltd.

It took a steering committee less than a year to draft the constitution and less than six months to have it approved by the organizations. The first full working meeting of the Council will be in late February. The idea was raised at a meeting of the Sports Turf Research Institute in June 1979.

Officers of the new group are Chairman M.J. Chance, Vice-Chairman W.N. Gilmour, Treasurer W. Royle, and Secretary J.P. Shildrick. Information on the group can be obtained from

Continues on page 10

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LANDSCAPE CONTRACTOR NEWS

ALCA focuses on modern management

Sessions at the 1981 ALCA Annual Meeting and Trade Exhibit in New Orleans, Feb. 8-13, will stress managing a business in a computerized, highly technical world. Approximately 1,000 landscape contracting firms are expected to be represented at the meeting.

Here is a sketchy outline of the event:

Sunday, Feb. 8
- Registration and Mardi Gras party

Monday, Feb. 9
- Estate planning

Concurrent workshops: marketing design/build, personnel development in maintenance firms, land reclamation.

Tuesday, Feb. 10
- Trade exhibit opens
- Al Hirt party in French Quarter

Wednesday, Feb. 11
- Equipment demonstrations
- Interior landscape seminar
- ABC's of computer applications
- Awards reception and luncheon

Thursday, Feb. 12
- Learning to live with the computer
- Computer display and demonstration
- Banquet

Friday, Feb. 13
- Financial management
- Adjourn at noon

Complete registration information for the show is available from Associated Landscape Contractors of America, 1750 Old Meadow Rd., McLean, VA 22101.

Tenth tropical foliage course January 13th

Orlando, Florida, becomes the foliage center of the country when the National Tropical Foliage Short Course is offered for the tenth time, in addition to major national displays of foliage and equipment at the Orlando Expo Centre. This is the biggest event in the interior plant field to date.

The workshop is divided into three sections: production, interiorscape, and marketing. Production topics include soil mixes, plant pest diagnosis, nutrition, irrigation, and production of specific plants. Interiorscape, topics include bidding, transportation, acclimatization, installation, delivery, and selling. The marketing sessions will cover working with wholesalers, supplying the mass merchandiser, and working with super markets. Additional sessions on asset management, tissue culture, and inventory management are planned.

Florida's foliage growers and equipment suppliers will display their material at the Orlando Expo Centre beginning Tuesday, Jan. 13. The four-day event will be headquartered at the Orlando Howard Johnson's Downtown Hotel. For more information, contact the Foliage Education and Research Foundation, Inc., 305-886-1036.

ASLA offer health coverage at lower rates

Landscape architectural firms with at least 50 percent of the employees eligible for membership in the American Society of Landscape Architects will soon be able to take advantage of a group health/life insurance program that could lower premiums and raise coverage. Firms with less than ten employees may benefit the most from the program, according to ASLA President Robert Woerner. The plan is underwritten by Sentry Life Insurance Co., selected over other companies by the National Executive Committee. Contact ASLA, 1900 M Street, N.W., Suite 750, Washington, D.C. 20036 for more information.

J.P. Shildrick, Sports Turf Research Institute, Bingley, West Yorkshire, BD16 1AU.

United States turf specialists have been attempting to form a similar group for the last three years without approval of a constitution.

SOILS

Computer data bank established by Scotts

Results from more than 100,000 soil tests made on U.S. golf courses have been stored on computer by the Pro-Turf Division of O.M. Scott & Co., Marysville, Ohio. With the information, Scotts hopes to produce summaries of soil characteristics for particular regions of the country. Superintendents in the regions can then find out what nutritional deficiencies need to be corrected.

Scott technical representatives will help analyze and interpret the soil test data for the superintendent. The desired result is more effective fertilization programs and perhaps lower costs.

The company reports that more than 90 percent of the nation's golf courses were tested for the information system.

OFFICERS

PGMS members cast ballots in Kansas City

John Van Vorst, supervisor of parks to Tenafly, NJ, is the new president of the Professional Grounds Management Society following elections during the group's latest meeting in Kansas City.

The president-elect for 1981 is Earl Wilson, vice president of Thornton-Wilson Inc., Maineville, OH. Wilson is a charter member of PGMS Southern Ohio Branch. Fred Rigger, grounds manager for the Padonia Swim Club in Cockeysville, MD, is the new vice president. Elected to a second term is Treasurer Robert Fisher, a past PGMS president and consulting horticulturist in Virginia.

LAW

Patent case decided in favor of Textron

A federal district court has ruled that a suit for patent infringement against the Jacobsen Division of Textron Inc. by Toro Company is invalid.

The Delaware court said that Jacobsen's manufacture of the Sno-Burst

Continues on page 12

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GOVERNMENT UPDATE

Minimum truckload weights cancelled

Proposed increases in the minimum truckload weights of nursery stock have been cancelled by the Central States Motor Bureau. Bohman Industrial Traffic Consultants had vigorously protested the increases in behalf of the American Association of Nurserymen.

In line with this and the fact that truckers can now charge any rate they choose, a "Truck Broker Directory" is available which lists over 4,000 sources for return loads, including truck brokers, backhaulers, distributors, and trip-lease contractors in all 50 states and Canada. The directory costs $25. and is available from J.J. Keller & Associates Inc., 145 W. Wisconsin Ave., Neenah, WI 54956 or call (800)558-5011.

Friends of the Earth expand petition

Friends of the Earth, who petitioned the EPA for buffer zones around fields sprayed by air or large broadcast systems, have also called for "permission to spray" notices from neighboring residences.

The EPA has dropped most of its activity on the petition because of too much pressure from the agriculture community and Congress. The agency will still look into the new proposal by Friends of the Earth, but no regulations are expected soon.

Carter signs act to aid small businessmen

Former President Jimmy Carter has signed into law the Equal Access to Justice Act (S-265). This permits reimbursement for attorney's fees to small businesses involved as either plaintiffs or defendants in suits involving federal agencies unless the government is able to prove its position.

U.S. Arboretum will get Japanese herbarium

The U.S. National Arboretum in Washington, DC has made arrangements to purchase what is believed to be the largest private herbarium in Japan.

The herbarium comes from Miyoshi Furuse, an amateur botanist and retired Tokyo bus driver who has spent more than 40 years building the collection of about 60,000 specimens. His entire collection, including duplicates, has about 130,000 items.

"When the transfer of the Furuse collection is complete, the Arboretum will have the largest herbarium of Japanese plants outside Japan," says Dr. Frank S. Santamour, acting director of the Arboretum. "The collection has great scientific value for botanical and horticultural research."

EPA claims fungicide Captan hazardous

The Environmental Protection Agency is considering the restriction or banning of the use of Captan, a widely used agricultural and industrial fungicide, based upon studies linking it to cancer and genetic damage in laboratory animals. However, two major chemical companies are disputing these claims.

Chevron Chemical Co. will defend the fungicide's use by trying to prove that it poses no significant hazard when used according to label directions.

A spokesman from Stauffer Chemical Co. said, "There isn't any evidence of human risk or a scientific basis for extrapolation of the unvalidated laboratory data cited by EPA."

At the conclusion of its investigation, EPA will decide whether to allow continued unrestricted use of Captan, to require new limits on its use, or to ban it.

snow thrower was not an infringement upon a Toro patent. In a related unfair competition claim, the court indicated that is would forbid Jacobsen from making certain advertising claims about its snow thrower, but held that Toro had failed to prove any damages with respect to those advertisements.

EQUIPMENT

Independent distributors form association group

An association to help meet the needs of independent outdoor power equipment distributors was formed in October.

Named the Outdoor Power Equipment Distributors Association, the group elected Joe Brady of Joe Brady & Associates, Birmingham, AL, as president. Wyn Eaton of Eaton Equipment Corp., Hamburg, NY, was elected vice president. William Niemeyer of the Niemeyer Corp., West Chester, PA, was elected secretary and Joe Porter of Porter Brothers, Shelby, NC, was elected treasurer.

The firm of Fernley & Fernley, Inc., will provide association management services for the group. The address is 1900 Arch Street, Philadelphia, PA.

COURTS

Monsanto set to protest EPA lawsuit

Monsanto Co. says it will protest vigorously a lawsuit brought against it by the Environmental Protection Agency seeking to force it to clean up alleged polychlorinated biphenyl pollution in Waukegan Harbor, north of Chicago.

The two-year-old suit originally charged only Outboard Marine Co. with violating its discharge permit by dumping hydraulic fuels containing PCB's, which it had bought from Monsanto. The EPA's action is "a clear attempt by the government to hold manufacturers of chemicals responsible for alleged improper waste disposal by others," says Monsanto's manager of product and environmental safety, John H. Craddock.

NATURAL PESTICIDES

Desert shrubs sub for expensive pesticides

Scraggly desert shrubs that make their own natural pesticides may offer alternatives to products now made

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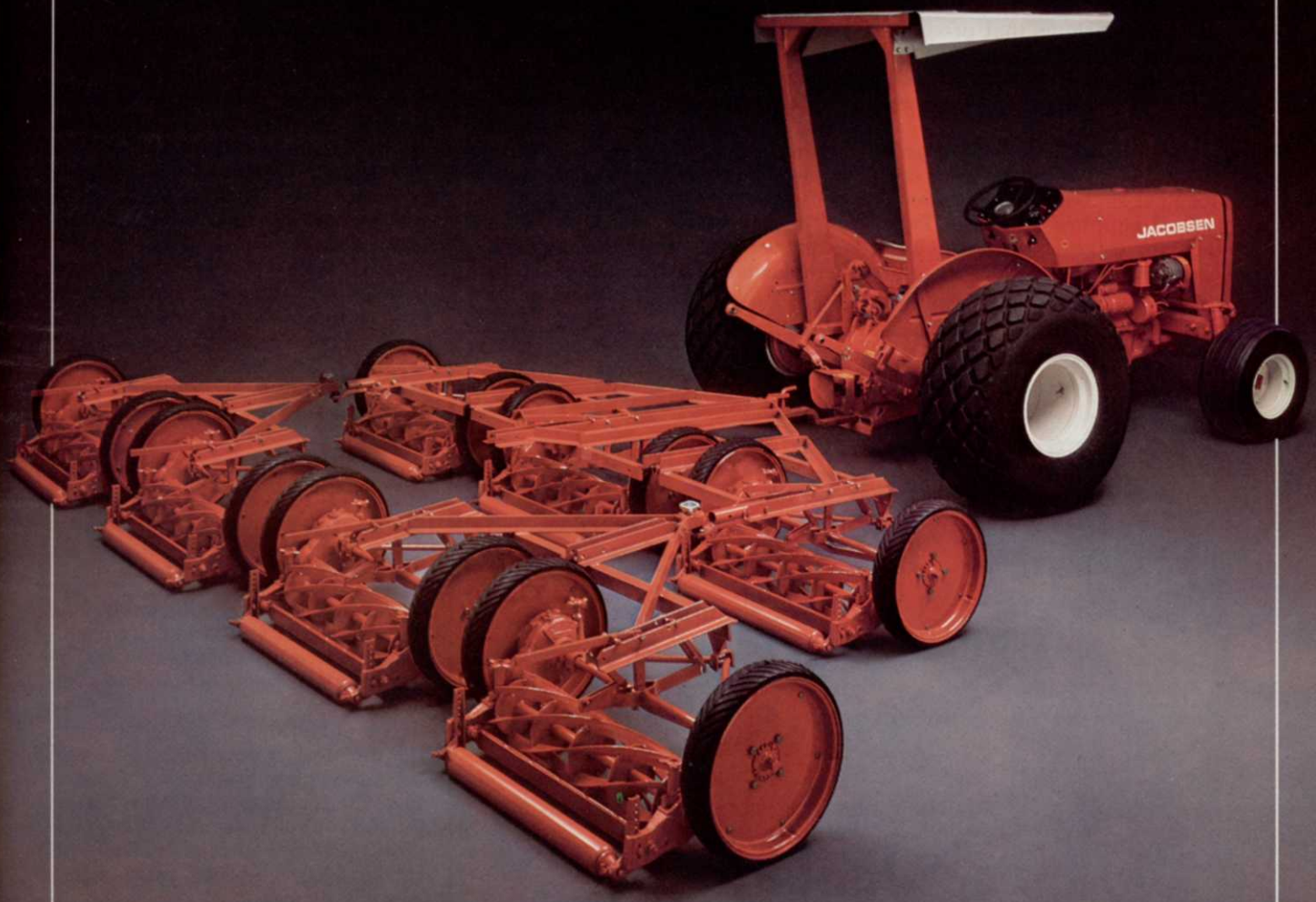

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from expensive petroleum, says a University of California biologist.

"We do have an alternative to petroleum-based chemicals, and we have it in natural sources," says Eloy Rodriguez of UC, Irvine. "And desert plants are not rare; they grow like weeds."

"The brittlebush is a good example. It is very common in Southern California, and it produces a whole repertoire of defensive chemicals," he says. Like most natural pesticides, the shrubs' defenses don't directly kill insects, at least not in concentrations found in nature. The brittlebush makes several chemicals classified as turpenoids, which repel hungry pests.

The brittlebush also makes chemicals called precocenes that produce more dramatic effects by confusing the bugs' development. "The adult (insect) will be sterile and sometimes they are deformed," he said.

Aside from pesticides, some desert plants may be farmed for use as substitutes for other kinds of petroleum products as oil supplies dwindle. Two popular possibilities, he said, are guaye, which produces a type of rubber, and jojoba, which contains a lubricant similar to whale oil. Both plants grow well in the desert but don't have the natural insecticides of the brittlebush. He cautioned, though, that just because a chemical is found in nature doesn't mean it's not dangerous.

SEED

Good harvest, markets help Vaughan-Jacklin

An excellent harvest of proprietary grass seed and promises of better sales in foreign countries and reclamation are brightening the profit picture for Vaughan-Jacklin Corp., Downers Grove, IL.

John Vaughan, president and chief executive officer, said sales have picked up and future bookings are very healthy for seed, foliage, and garden products sold by the corporation. Vaughan said potential sales to China, Japan and parts of Europe are great and implementation of reclamation regulations will start to take effect.

The corporation's sales for the third quarter of 1980 were down slightly but earnings increased. Bookings indicate a strong fourth quarter. Vaughan cited this year's hot, dry summer for decline in sales of some plant products.

TURF

Study relates effect of petroleum spills

A field study conducted on 'Tifgreen' bermudagrass has determined the injury symptoms and subsequent recovery rates from petroleum spill damage.

D. Johns and J.B. Beard of the department of soil & crop sciences, Texas A&M University, applied five petroleum products commonly used in turfgass maintenance equipment—gasoline, motor oil, hydraulic fluid, brake fluid, and grease. They then attempted to treat the turf with calcined clay fines, activated charcoal, and detergent.

The detergent washing proved to be an effective treatment for turf with spilled hydraulic fluid, brake fluid, and motor oil. In two cases, they achieved complete recovery three to six weeks sooner than with other corrective procedures.

None of the corrective treatments were effective on either the gasoline or grease damaged turf. The bermudagrass recovered rapidly (three to four weeks) from gasoline spills without corrective procedures. It took more than 10 weeks to recover from grease spills.

EQUIPMENT

Standard issued for chain saw safety

Chain saw operators will benefit from new standards established for manufacturers that have been published by the American National Standard Institute.

The publication gives requirements for the design and construction of hand-held, gasoline powered chain saws. It includes requirements for throttle control systems, handles, pull-type starters, controls, fuel and oil tanks, exhaust systems, saws chains, bars, and guards.

Other requirements address chip discharge, sound levels, kickback, balance, and vibration. Test procedures, tables, and diagrams illustrating components and specifications are also provided.

Copies of American National Standard Safety Requirements for Gasoline Powered Chain Saws, ANSA B175.1-1979, are available from the Institute's Sales Department at $5.50 each.

Continues on page 48

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HARDY, LOW MAINTENANCE SHRUBS SUIT GREAT PLAINS LANDSCAPES

By J.E. Klett and Iris Thoreson, Associate Professor and Graduate Student, Department of Horticulture-Forestry, South Dakota State University, Brookings, SD

The climatic conditions of the Great Plains present a real challenge for growing woody ornamentals. The cold, long winter months along with a steady wind current with sudden changes in temperature makes winter hardiness an essential element for plants grown in this area. The usually low monthly rainfall during the growing season along with a steady wind creates a challenge to the gardener during the growing season. Most of the soil in the area is alkaline which limits the plant choice furthermore. However, homeowners continue to show an increased interest in home and public beautification with a desire for more low maintenance plants. Contemporary lifestyles and homes limit the homeowners' time for landscape maintenance; therefore, careful consideration must be made in selecting woody ornamentals to fit these needs. However, ornamental features on woody plants such as flower color, fruit color and size, foliage appearance, fall color and dwarf growth habit don't need to be sacrificed.

Evaluation research which yields a greater variety of plant material adaptable to rigorous climates has been conducted for many years at various state universities and arboreta in the Great Plains. At South Dakota State University research conducted by the Horticulture-Forestry Department over a period of time at several sites within South Dakota with varying climates has resulted in certain woody ornamentals which are more maintenance free and adaptable to this climate. The following discussion will deal with some of the more promising low maintenance plants that will grow in this area which were evaluated in our research.

Several shrubs from our research trials have emerged as outstanding small shrubs (generally maturing 4 feet or less) because of their growth habit and other good ornamental characteristics. Plants falling into this category include: *Abeliophyllum distichum* (Korean Abelialeaf), *Amorpha brachycarpa* (Short-Podded Leadplant), *Berberis koreana* (Korean Barberry), *Caragana pygmaea* (Pygmy Peashrub), *Diervilla lonicera* (Dwarf Bush Honeysuckle) and 3 cultivars of *Potentilla fruticosa.*

Abeliophyllum distichum (Korean Abelialeaf) is an early bloomer with its pleasantly scented flowers appearing in early to mid-April. The conspicuous, small white blossoms are borne in dense clusters along the previous year's wood before leaves appear. Korean Abelialeaf adapts to almost any well drained soil in full sun or light shade. It is a good companion shrub for the forsythias. It has been in our trials since 1967, and has bloomed each spring. The leaves are darker green throughout the summer, turning a purplish fall color. The growth habit is a little more open than desired, but early white flowers announcing spring's arrival make it an adaptable plant for a rigorous climate.

Amorpha brachycarpa (Short-Podded Leadplant) grows erect to a height of three feet. Its dull gray-green pinnately compound leaves make it conspicuous among plants in a shrub border. Small purple-blue flowers borne in spikes ranging up to 10 inches long appear in June-July. The plant is quite adaptable to poor, dry, sandy soils and is easy to transplant, making it another adaptable low maintenance plant.

Berberis koreana (Korean Barberry) displays a deep red fall leaf color which makes it a winner. In addition, the fruit clusters — bright red, egg-shaped true berries — are effective in the fall and into winter. The Korean Barberry is classed as a small shrub growing 4 to 6 feet tall and slightly less in spread. Because of spines, usually simple, borne on its stems and its dense growth habit, it serves as an excellent barrier plant.

Yellow flowers appear in early to mid-May in drooping clusters which are quite showy. It is easy to transplant and tolerates most soils except permanently wet ones. It may be planted in full sun or light shade. Any pruning desired may be done at anytime. It has proven to be winter hardy and adaptable to more drought type conditions.

The rounded form of *Caragana pygmaea* (Pygmy Caragana) adds to its worth as a landscape plant. Although very fine textured, the Pygmy Caragana grows 3 to 4 feet high. Its bright yellow pea-like flowers in late spring are the most desirable ornamental feature other than the gray-green foliage color. Recommended uses include shrub borders and hedges. This plant is quite adaptable to drought conditions and withstands wind and extremely cold temperatures. However, winter appearance isn't the most desirable ornamentally.

Diervilla lonicera (Dwarf Bush Honeysuckle) is a hardy shrub with a medium texture. It bears yellow flowers in July into August at the terminal ends of the branches but they are not conspicuous. It will grow in dry soil types and makes a good bank cover. The new growth is more red-bronze and has a more dwarf compact growth habit.

Potentilla fruticosa (Bush Cinquefoil) with its silky leaves and bright buttercup-yellow flowers is a compact hardy shrub ideal for foundation or border plantings. It adapts to more rigorous climatic conditions and produces its flowers throughout the growing season from June until frost.

Three cultivars that perform well in the midwest and plains regions include: 'Coronation Triumph,' 'Gold Drop,' and 'Jackmannii.'

'Coronation Triumph,' one of the larger cultivars, grows to a height of 3 to 4 feet. It has a dense, mounded growth habit with soft green foliage. Its large quantity of yellow flowers makes it a favorite.

Deep yellow flowers and very small leaves are characteristics of the cultivar 'Gold Drop.'

'Jackmannii' also is a larger plant growing 3 to 4 feet in height. Its foliage color is medium green. The bright yellow flowers are borne in profusion.

These cultivars of Bush Cinquefoil transplant easily. They withstand cold temperatures and poorer soils. However, for best flower production they should be planted in full sun in fertile, well drained soil.

Rosa blanda (Meadow Rose) is distinguished since it is often unarmed and has red to purple-red bark. This bark coloration adds to the winter landscape. Flowers of the Meadow Rose are single and pink, typical of "wild" rose species, appearing in May and June. The

Common Sea Buckthorn bears bright orange berries along its stems.

numerous red hip fruit prevail throughout the winter and add winter texture. It does sucker but is quite adaptable in poor growing conditions.

Shrubs falling into the more medium height category (4-8 feet tall) from our trials, which are more maintenance free and will withstand rigorous climates include: *Caragana frutex* 'Globosa' (Globe Caragana), *Cornus sericea* 'Isanti', *Lonicera tatarica* 'Valencia' (Valencia Honeysuckle), *Philadelphus X lemoinei* (Lemoine Mockorange), *Sorbaria sorbifolia* (Ural False Spiraea), *Viburnum opulus* 'Compactum' (Compact European Cranberrybush) and *Syringa meyeri* (Meyer Lilac).

Caragana frutex 'Globosa' (Globe Caragana) is a slow growing compact, non-suckering shrub. Its name designates the globe-shaped growth habit which is maintained to maturity. Very little, if any, pruning is necessary to maintain this shape. Flowers and fruit are not outstanding but its dark green foliage which holds late into the fall is a plus feature. Its growth rate and habit makes it an ideal hedge or foundation plant. Globe Caragana tolerates alkaline soil conditions and more drought type growing conditions.

The bright red winter bark color of *Cornus sericea* 'Isanti' (Isanti Dogwood) is an outstanding ornamental feature of this medium-sized, compact shrub. Small white flowers in flat clusters are generally produced in early summer followed by abundant white to blue-white berries.

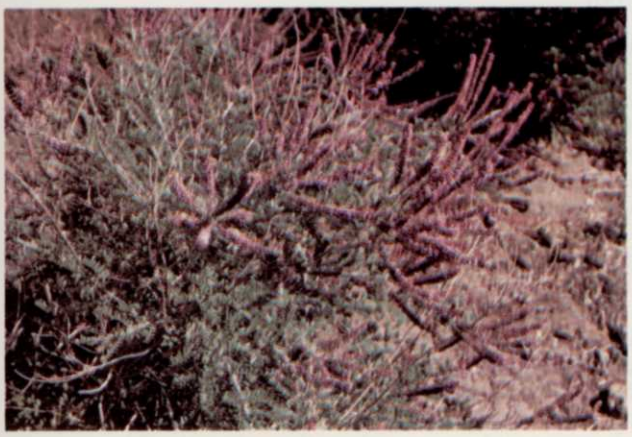
Isanti Dogwood tolerates light shade but is best planted in sun, which brings out the full color of the stems in the winter. It grows in almost any soil and does well in wet places. This cultivar has been planted in our trials since 1970 and has maintained its dwarf-mounded growth habit.

Most honeysuckles are not maintenance free since they become quite large and open with age. *Lonicera tatarica* 'Valencia' is more compact in growth habit than most cultivars of Tatarian Honeysuckle. The foliage is bluish-green in summer and bears pink to white flowers in June. The fruits are numerous, orange, and persist into the winter. The fruits are a little later in developing than most honeysuckles but are high quality.

Philadelphus X lemoinei (Lemoine Mockorange) is a graceful shrub which bears sweet scented, showy, white flowers in late spring. Its erect shoots have exfoliating brown bark. It is adaptable to cold winters and blooms profusely each year. However, very low temperatures could cause some winter dieback.

Sorbaria sorbifolia (Ural False Spirea) is valued for its large plumes of white flowers in late June into July when not many other woody plants are in blossom. It is one of the first shrubs to leaf out in the spring, and its

Continues on page 18



Short-podded leadplant is adaptable to poor, sandy soils and is easy to transplant.

Korean barberry displays red leaf color in the fall and bright red berries.

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pinnately compound, bright deep green foliage gives it a medium-textured appearance.

Ural False Spirea transplants readily. However, its suckering habit often makes restraint necessary. It can be used effectively in the shrub border, for massing or grouping, or for a bank cover. This medium-sized shrub prefers moist, well drained soil in full sun or light shade and is winter hardy.

Syringa meyeri (Meyer Lilac) is a well branched upright shrub with a mature height of 5 feet. Its dark green glossy foliage is attractive and long lasting. Flowers appear in late spring in dense upright clusters at the end of branches. They are violet-purple to light lavender in color and have no great fragrance.

Meyer Lilac requires well drained soil and makes an ideal plant for home use because of its moderate size, reliable yearly flowers, small foliage, and freedom from pests.

Viburnum opulus 'Compactum' (Compact European Cranberrybush Viburnum) has a dense growth habit with a mature height of 4 to 5 feet. The white blossoms give a pin-wheel effect because of an outer ring of sterile, showy flowers and an inner portion of fertile, inconspicuous flowers. The blooms appear in mid-May and are borne in flat clusters. The bright red berries make a brilliant show in the fall and winter. This cultivar is recommended for use in smaller areas where space is limited. This plant doesn't seem to be as infested with aphids as the species. It is effectively used in masses or as a specimen plant.

Two shrubs maturing greater than 8 feet in height which are adaptable and more maintenance free include the *Hippophae rhamnoides* (Common Sea Buckthorn) and *Viburnum lentago* (Nannyberry Viburnum).

Hippophae rhamnoides (Common Sea Buckthorn) is best used in masses and shrub borders in naturalistic settings. In March or April, inconspicuous yellowish flowers are borne on bare branches, but in the fall the female plants bear abundant bright orange berries along their stems. Birds dislike the fruit due to its acid nature so it remains on the shrub through the winter until early spring. Both male and female plants are necessary for fruit production. A ratio of 6 females to 1 male is usually sufficient for pollination.

Common Sea Buckthorn prefers full sun and well drained soil — actually performing better in sandy, infertile soil than in rich soil. It also withstands salt spray.

Viburnum lentago (Nannyberry Viburnum) is a vigorous large shrub or small tree that can be used effectively in a background or screen planting. Flat clusters of cream-white flowers appear in late May. The mature fruit is a bluish-black berry which persists into the winter, serving as food for birds. The glossy medium green foliage of summer turns to purplish red in autumn.

Nannyberry Viburnum is easily transplanted and adapts to various conditions in sun or shade. However, it can sucker.

These eighteen plants are examples of woody ornamental plants which have proven to be outstanding for our more rigorous climate over the years. Most of these plants are low maintenance along with offering numerous ornamental characteristics. These plants can enhance residences and at the same time leave homeowners more leisure time. **WTT**

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SUPERINTENDENT STRIVES FOR CONSTANT, MODERATE TURF GROWTH

By Ed Ginn

As the casual visitor approaches Hilton Head Island and its plethora of golf courses, it takes a sharp eye to spot the miniature waterfall in the pecan grove that marks the unobtrusive entrance to Moss Creek Plantation — still clinging to the mainland.

In an official brochure, the line reads "Moss Creek . . . it's not for everyone." This is a reminder that, unlike its island neighbors competing for tourist attention, Moss Creek is a private residential community open only to property owners and their guests. There are a few exceptions, as when its distinctive Devil's Elbow South course is opened to host such events as the CPC Women's International tournament early each May.

The Devil's Elbow name comes from early Carolina history. It was the title of a Barony granted in 1663 to Sir John Colleton by England's King Charles II. Later the Barony was divided into six plantations that became important producers of rice, indigo, and the famous Sea Island cotton. One of those plantations was Bog Bluff which evolved into a cattle ranch and was renamed Moss Creek when it entered a new life in 1973. The concept then was that Moss Creek would be carefully designed for low density housing of a very fine order. Facilities were to be top drawer with a rigid rule of privacy.

Salt marshes and water at high tide make this par-3 hole at Devil's Elbow a challenge to the finest golfer. The green is nearly surrounded by water at high tide and winds can require any club in the bag to negotiate the 190 yards.

During Hilton Head's "difficult times" in 1975, ownership passed from the original Moss Creek developers to Northwestern Mutual Life Insurance Company, but the new owners hewed to the original concept.

The first 18 holes, Devil's Elbow South, was started in January, 1974, and opened in March of 1975. It was designed by George and Tom Fazio, and is considered one of their finest accomplishments. Of moderate length, about 7,000 yards, it is a relatively tight course with a number of holes bordering the treacherous salt marsh. Number 15, with a green virtually surrounded by water at high tide, is probably the most scenic. Rated the toughest par 3 from the men's tee, a player must carefully assess the wind. Residents say that a short iron might carry more than the 190 yards from the championship tee on some days. On the next day (or the same afternoon) a driver might find you falling short.

A new 18, Devil's Elbow North, was started in September, 1978 and was opened in March, 1980. It is shorter (6,650 to 6,700 yards) than the South course, somewhat tighter, and with smaller greens. Turf was doing nicely until a seven week drought in late spring coupled with a depleted water supply caused some anxious moments. This occurred during the critical transition period as ryegrass was fading out and the permanent grasses were just reviving. There was some evidence of this in mid-July when I visited, but turf appeared to be healing quickly.

Gerry Beaman, golf course superintendent, has things well in hand at these splendid courses. Gerry came to Moss Creek early in 1974 and has lived with the layouts almost from the day the first fairway was carved out of the old plantation. A graduate of Clemson University (tiger paws greet you as you step into his office), Gerry was determined that the quality of the turf would match the high standards of the Moss Creek community.

Fairways were shaped with the naturally existing soil, but greens were constructed from imported materials. The soil mix is 80 per cent concrete sand and 20 per cent pine bark, blended to a depth of 18 inches. French tile provides sub-surface drainage. Greens were sprigged with Tifdwarf Bermudagrass, fairways with 419 Tifway Bermudagrass. Roughs and tees consist of 419 Bermudagrass, with a considerable amount of lovegrass in the roughs.

Overseeding in this part of the South is done in October to supply color throughout the cooler months. A 50-50 mixture of Derby perennial ryegrass and Jamestown chewings fescue is used on the greens. Fairways are overseeded with a 60-40 blend of annual and perennial ryegrass.

Lush, dark green grass may look great, but does not always signify the best playing surface. While Gerry

does attempt to keep a pleasant color year-round, he is more concerned with texture, turf vigor, and playability. To accomplish this he strives for a constant, but moderate growth curve. "We're not in the business of growing grass," Gerry says. "We're maintaining grass, and we want to keep it healthy while keeping growth as slow as possible."

In his plans for a turf fertilization program, Gerry chose ureaformaldehyde (Nitroform) as his source for the slow, controlled release of nitrogen that he needed. After the first 18 holes were completed, he made applications of granular UF exclusively from late spring through the summer, and followed up in mid-September with an application of sulfate of potash.

Recently, however, Gerry installed a "fertigation" system so he could inject liquid fertilizer into his sprinkler system. His feeding program now goes something like this:

December 1st until April 1st.....20-0-0
April 1st until July 15th 14-1-7
July 15th until overseeding (about Oct. 1st) 11-1-11

He makes supplemental applications of ureaform when needed. October and November are the months when no fertilizer, or "not much" is used.

Suppliers are important people in Gerry's profession since the superintendent is responsible for maintaining all property, except that belonging to private homes. Dependability and promptness of delivery are essential to keep an operation like Moss Creek moving on schedule. Fertilizer products are supplied by reliable sources, such as Bingham Seed Company of Jacksonville and Regal Chemical Company of Atlanta.

There is no golf course, public or private, that doesn't present problems for the superintendent. We asked Gerry about his.

Live oaks are a trademark of the Low Country, and Moss Creek has preserved theirs beautifully. But when a green is almost surrounded by trees it creates an awful lot of shade for sun-loving Bermuda. Gerry calls this his number one problem. In addition to the oaks, Moss Creek has a good population of palms, pines, and cedar. The ubiquitous palmetto grows close to the ground and usually does not produce problem shade.

Drought is not an annual problem, but is always a threat. Moss Creek has a sewage treatment plant and recycles effluent water for irrigation use. It can cope pretty well with the average dry spell, and if drought doesn't come again during the turf transition period, all should be well.

Cart traffic and unrepaired ball marks are probably Gerry's second biggest problem. He is certainly not alone when he mentions these. Working around play, perhaps, may be more tedious on a course like Moss Creek. Here, it may require a bit more tack, and cannot be hurried.

Turnover in help is another problem Gerry mentioned that is common everywhere. Twice during our tour of the course Gerry stopped to correct workers on some aspect of their routine. The care taken at Moss Creek is evident everywhere. Only walking mowers are used on the greens, since Gerry feels they give a better quality cut and leave a finer appearance.

One nice touch is the placement of granite markers on the men's tees, giving exact yardage to the center of the green. These are a real help on the par 3 holes, although wind velocity indicators might be more appropriate.

While Moss Creek residents may cherish their privacy, they are still generous hosts to many golf events. In addition to the annual Women's International, Devil's Elbow South has been host to the USGA Boys Junion Championship, the Moss Creek Seniors Invitational (a men's amateur test), and the Carolinas-Virginias Cup matches. It has scheduled the Women's Western Amateur (in 1981), the Southern Amateur in 1982, and the USGA Seniors Amateur in 1983.

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PROFESSIONAL PEST CONTROL: PART OF THE DISNEY MAGIC

For Bill Tanner, pest control supervisor at Walt Disney World's Lake Buena Vista Communities, maintaining the area's beautiful appearance is anything but magical. "We've got at least 76 different types of trees, five different grasses and over 300 varieties of ornamentals," he states, "and they all require a great deal of care."

A unique vacation community located on approximately 4,000 acres of Disney's expansive property in central Florida, Lake Buena Vista combines resort hotels, vacation villas, an office park, outdoor recreation, and a shopping village in a setting of grass, gardens, lakes and forests. Like all Disney World facilities, it is kept in top-notch condition all year round.

"Disney's concept was to create a total destination resort where we could house guests and provide them with all their needs, from the theme park itself to evening entertainment and tourist shopping," says Tanner, who came to Lake Buena Vista in 1978.

Of the community's 4,000 acres, 500 are what Bill refers to as high maintenance landscape areas. These are highly visible sites around Lake Buena Vista Village itself, and all areas developed for rental units or hotel sites.

"The village was designed like a New England seaside village, where everything surrounds an inlet," Bill explains. "There are 27 unique shops and a variety of places to eat."

Chinch Bug Resistance

"Because grass areas in the village are heavily trafficked, we elected to plant a certified, blue tag variety of St. Augustine Floratam." Developed by Florida State University and Texas A&M, Floratam is resistant to chinch bugs, a real menance to St. Augustine strains in Florida. "We try to keep a handle on factors that might stress our grass in any one area," Tanner points out, adding that they choose between Floratam, Argentine Bahia, Zoyzsia, Bermuda and Centipede in selecting a variety to suit the theme and growing environment of each area. "The traffic in the village and the resulting stress make the area weed prone. This causes enough problems without adding chinch bugs."

Lake Buena Vista Village gives Bill Tanner a wide assortment of vegetation to pamper under heavy traffic conditions.

All grass areas are under irrigation, a program Tanner feels is necessary to maintain the high quality appearance Disney is known for, but the beauty is also accompanied by a healthy dose of complications. "We are on a timed pop-up irrigation system all year round," Bill explains. "But we also get more than our share of rain. In September of 1979, for instance, we got 17 inches in 30 days and were forced to shut the system down, but that still didn't solve our problems."

Most of the landscaped areas Tanner works with are land fill created from soil dredged out to create the lakes. "It is a morrow clay or loose sand, so the water either runs down to the bedrock or hangs in the morrow. This keeps the root systems too wet too long," he laments, noting that defoliation often results.

This situation, coupled with Florida's warm days and cool nights, also sets up an almost ideal environment for the development of fungi such as pythium, leaf spotting and bacteria wilt in the annual flower beds, not to mention various insect problems. "We get leaf miners in our marigolds, cutworms and large green hornworms in our poinsettias, and webworms, thrips and aphids everywhere," Tanner complains.

Prevention Best Cure

To protect the annual plants which cost anywhere from 65 cents to $4 each, Bill again relies on preventive measures. "We will often have 2,000 plants in one bed for up to 2 months, so we try to nip these problems in the bud. We apply fungicides on a 4- to 7-day schedule and rely primarily on systemic-type insecticides, going to contact killers only on an as-needed, symptomatic basis," says Tanner, a certified pesticide applicator in the State of Florida.

Bill tries to base all his pest control programs on the theory that dealing with a problem before it manifests itself is the best approach. "When it comes to weed control, we feel pre-emergent treatment is the best management tool," says Tanner, a member of the Florida Turf Grass Association. "Our goal is to prevent the weed from germinating in the first place. Once it does come up, due to excessive rainfall or chemical leaching caused by heavy irrigation, we make use of postemergent herbicides, as well."

Pre-emergent chemicals are applied to each annual plant bed as needed. "Our first mission is to prevent seeds from an old variety or weed seeds brought in by the wind from germinating in the high-quality growing medium we create for the desired annuals," Tanner explains. The bed also receives a preplant application of insecticide and fungicide so the plants will take up these chemicals as they grow. Bill feels this gives him a head start on pest control.

Mulch A Problem

Despite these efforts, Tanner still experiences his worst weed problems in established ornamental beds. "These beds are planted and then mulched over," Bill

observes. "We get re-introduction of weeds from the mulch, and it also works against the preemergent chemicals as it decomposes."

To control the resulting weeds, Tanner often uses glyphosate (Round up) herbicide. "We need to use a non-selective chemical, but can't risk any residual soil activity whatsoever. The best answer we've found to this predicament is to apply a 2 percent solution of glyphosate in water using a 2-gallon compressed air sprayer. Our control has been excellent," he says.

Tanner also uses glyphosate to control weeds growing in concrete expansion joints, or to eliminate existing growth in areas slated for total renovation. "We had one bermudagrass lawn surrounded by shade trees," Bill recalls. "The trees had grown so large the grass was no longer getting adequate sun. It was under constant stress."

Applying the same 2 percent solution of glyphosate to the area, Tanner waited seven days and then came in with a sod cutter to take off the top inch of the soil. "We started with glyphosate because we had to be sure the bermuda was dead, roots and all. We knew just removing the top inch of soil could not get that job done. Then we replanted that lawn with St. Augustine Floratam. It's been more than a year now, and we still haven't seen a trace of bermuda yet."

Tanner has assigned one of his six staff members to full-time duty making spot treatments with the "translocated" herbicide, but has by no means left himself shorthanded in carrying out other responsibilities. "We have an extremely experienced staff," he boasts, with good reason. "One man is a graduate entomologist and another is a graduate horticulturist." While their specialties are not ignored, Bill insists each staffer be well-versed in every area of pest control.

One Man, One Area

In fact, Tanner's management system assigns each man total responsibility for a particular area. "Each man has to be able to function in any pest control capacity, so we don't just hire anybody. An applicant has to have a great deal of experience under his belt," Bill states, pointing to insistence on following label directions for the products he uses to the letter. "We can't afford to have someone go out and do the wrong thing in the wrong place. That can be very costly, and it's not what we want our guests to see."

According to Bill Tanner, a great deal of the success and beauty of Disney World has to be attributed to the people who work there. "Our employees are treated very well, and I think they project that to the guests," he explains. "There's a feeling you can't put a name to, but the guests get it everywhere they turn—from the person that helps them park, to the person who drives them back to the lot that evening. Disney's concept was a park that would appeal to the kid in everybody," he says proudly, adding that he visits the facility twice a month himself.

"The number one priority of every Disney employee is the comfort and safety of the guest," Bill Tanner concludes. "My responsibility is to see that Lake Buena Vista is maintained as close to perfectly as possible. At Disney World we do everything 100 percent. I guess that's the real magic behind the magic." **WTT**

TWO GREAT GAMES ONE GREAT GRASS

Super Bowl XIV and the Rose Bowl classic were the great games. The turf? That was Derby Turf-type perennial ryegrass.

Derby was selected by George Toma, the man responsible for the Super Bowl XIV turf and Gus Huntly, turf manager for the Rose Bowl game, because of the special requirements for these special games.

Toma and Huntly wanted a fast-germinating, dark-green, handsome grass as well as one tough enough to take a pounding and still look great for the television cameras.

And Derby did it all. Of course, it will do more. It mows beautifully and thrives when cut at 1½ inches or at 3/16 inch on golf greens. In Southern areas it's a top choice for winter overseeding of golf greens.

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LOW MAINTENANCE VIBURNUMS CREATE COLORFUL ENVIRONMENT

By Douglas Chapman, Horticulturist, Dow Gardens, Midland, MI

Viburnum composes an outstanding group of low-maintenance shrubs that are under-used. Every landscape would be enhanced by the addition of a few. Each species is quite different, but contains a thread of commonality. Similar landscape characteristics include flowers, fruit, and outstanding fall color. The flowers are borne terminally, usually white or creamy-white in color. The fruit are in single drupes, ranging in color from red to yellow, blue, and blue-black. Often Viburnum fruit is edible and serves as a secondary source of food for birds. The fall foliage color is another characteristic which can't be over-emphasized. It ranges through red, scarlet, yellow, and purple. Viburnum should be broken into two groups—native and imports from Europe and Asia. The native Viburnum include *Viburnum acerifolium, V. dentatum, V. lantana, V. lentago, V. prunifolium,* and *V. trilobum.*

Mapleleaf Viburnum *(V. acerifolium)* is native from Minnesota in the north to North Carolina in the south. It is a rounded shrub, 4 to 6 feet in height and 3 to 4 feet in width at maturity. *V. acerifolium* will grow as an understory shrub or will persist in sun, but thrives in shade. Mapleleaf Viburnum grows best in a sandy, well-drained soil but will stand a fairly high water table. Its landscape effectiveness is in native plantations, e.g., screens, border, or mass plantings. Pruning should be done at the base to encourage additional stems, but little pruning is needed. The small, maple-shaped leaf is a bright green throughout the summer, becoming a reddish-purple in the fall. Flowers are very effective during late May through early June, being 1 to 1½ inches in diameter and creamy-white in color. The fruit is ¼ inch in diameter and bluish-black when ripe (during mid-September). Insect and disease problems are almost nonexistent. Mapleleaf Viburnum requires the least maintenance of all the Viburnums.

Arrowwood Viburnum *(V. dentatum)* is a 5 to 9-foot upright oval shrub with a spread of 6 feet at maturity. This plant suckers readily; thus frequent spring basal pruning will help contain this woodsy native. *V. dentatum* thrives in partial to full sun. Optimal soil is a well-drained, sandy loam. Flowers are effective for ten to twelve days during late May. The 2 to 4-inch terminal creamy-white flowers can be outstanding in an intimate garden situation. The leaves are small (1 to 3 inches long), oval, and coarsely dentate. Summer foliage is a clear yellow-green with fall color varying from nonexistent to scarlet-yellow or purplish-red. Often the entire range of fall color can be seen on the same plant. Arrowwood is one plant that should be selected for fall color. The bluish fruit is effective through September and October or until the birds have eaten it. Its landscape value is obvious as a hedge,

Blackhaw viburnum leaves (left) are a clear dark green in the summer and scarlet to purple in the autumn.

American Cranberrybush viburnum (above) displays white flowers, up to four-inch cluster, in May.

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screen, or in native plantations in the understory plant rather than sunny-open situations.

Wayfaringtree Viburnum *(V. lantana)* is a naturalized native of Europe. It is a multiple-stemmed shrub or a rounded tree, 10 to 14 feet in height, with a spread of 10 feet. Summer leaves are coarse texture while being dull green in color. Fall color in the mid-West is nonexistent or a dull maroon. *V. lantana* flowers during early May. The 3 to 5-inch terminal cream-white flowers create an exciting addition. Fruit is ⅓ inch in diameter and ranges in color from yellow to red and finally black at maturity. As a landscape feature, fruit is considerably more effective and colorful during summer than at maturity. This multiple-stemmed shrub should be planted in full sun or partial shade. It thrives in high organic, well-drained soils. Pruning is a task which should be considered every two to three years. Basal spring pruning, which is similar to the treatment of forsythia or lilac, removes the oldest canes first, renews the shrub, and keeps it from becoming too dense. In commercial landscapes, it is effective as a specimen or in mass plantings.

Nannyberry Viburnum *(V. lentago)* is an outstanding specimen shrub or small tree. It has an upright oval habit of growth, reaching 15 to 18 feet in height and 6 to 8 feet in width at maturity. Wyman has reported specimens of *V. lentago* reaching 25 feet in height. This plant prefers to be grown in full sun with well-drained soils. Specimens grown in partial sun or shade often get mildew. The 3 to 8-inch creamy-white flowers are effective mid through late May. The ½-inch drupe of blue-black fruit are an interesting addition while being quite effective during September. The summer foliage is a glossy yellow-green, becoming a dependable purple or scarlet in the fall. The 2 to 4-inch long leaves give a somewhat medium texture. In the landscape, individual specimens, shrubs, or trees can be particularly effective, while in large area landscapes, mass plantings have been desirable.

Blackhaw Viburnum *(V. prunifolium)* is indeed an outstanding native Viburnum. It can be grown in full sun or partial shade. This oval shrub or specimen tree reaches 15 feet in height and 8 to 12 feet in width. It flowers about mid-May. The creamy-white, 2 to 4-inch terminally borne flowers contrast well against the summer foliage. The leaf is a clear dark green during the summer with fall color ranging from scarlet to purplish-red. In fact, the fall color of Blackhaw is outstanding and dependable. The fruit is equally exciting. It ranges from yellow to pink and finally blue at maturity. Blackhaw is edible, having been used by early settlers in jellies and jams. Although *V. prunifolium* prefers well-drained soil, it will tolerate heavy clays as well. Blackhaw is extremely low maintenance, requiring little or no pruning. It can be equally enjoyed as a specimen or in mass plantings for the home or commercial landscape. Insect and disease problems don't exist. *V. prunifolium* is the aristocrat of native Viburnums.

American Cranberrybush Viburnum *(V. trilobum)* is a regal native. Its habit is an upright oval, reaching 8 to 12 feet in height with a 5 to 8-foot spread. It is considerably more effective than European Cranberrybush Viburnum *(V. opulus)*. *V. trilobum* suckers freely, thus annual pruning is important. This annual spring basal pruning is again similar to treatment of lilacs, removing old diseased canes, reducing the overall height, and, of course, improving the vigor of the plant. The white flowers are 3 to 4 inches in diameter and extremely effective during mid-May. The large reddish fruit often hold on and are effective from September through February. Foliage is rich green throughout the summer, becoming scarlet in the fall. American Cranberrybush should be planted in full sun but will tolerate light shade. It is effective as a specimen, shrub, and screen planting. American Cranberrybush is considerably more effective with fruit and fall color than is *V. opulus*, but it is more difficult to obtain in the trade. It should be propagated and used more often as it has a more narrow upright habit, is cleaner in appearance, and certainly has outstanding fall color.

These native Viburnums have few insect and disease problems, require minimal pruning, and fit in almost any landscape, resulting in a natural-woodsy feeling. Good companion trees for many of these Viburnum include Scarlet Oak, Red Oak, White Ash, Green Ash, Red Maple, Sugar Maple, Silver Maple, Paper Birch, and American Beech. **WTT**

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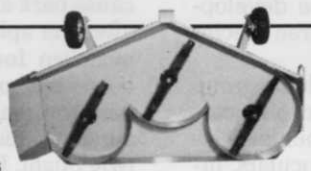

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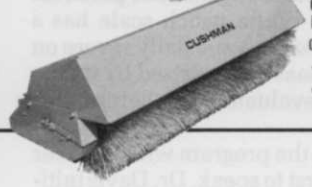

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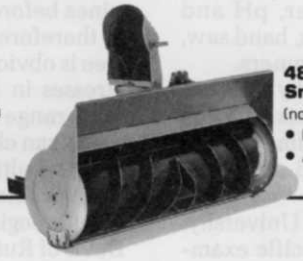

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EXPERTS DISCUSS NEW FINDINGS, TECHNOLOGY TO DIAGNOSE TREES

By Alan D. Cook, horticulturist, the Dawes Arboretum, Newark, OH

Tree diagnosis and evaluation has become a technical, scientifically based profession. Electronic equipment, pathologic expertise, and a total knowledge and background of trees has replaced any "I guess..." or "It looks like..." comments from the professional. Experts presented a thorough review of factors affecting health and monetary value of trees at the Tree Diagnostic and Evaluation Workshop in Columbus, OH. Speakers came from 11 states to address an audience of more than 100, representing 21 states and Canada. Here is a summary of what was said.

Ken Reisch, associate dean of the College of Agriculture and Home Economics at Ohio State University welcomed the group to the O.S.U. campus. He was followed by his former mentor, Dr. L. C. Chadwick, retired O.S.U. horticulture professor and current chairman of the Council of Tree and Landscape Appraisers. Dr. Chadwick entreated the audience to follow some basic guidelines of tree evaluation which would lead to both more realistic evaluations and narrower differences among evaluators. He reviewed some of the evaluation procedures outlined in the Guide for Establishing Values of Trees and Other Plants (Available from the International Society of Arboriculture, c/o E. C. Bundy, Executive Secretary, P. O. Box 71, 5 Lincoln Square, Urbana, Illinois 61801). He also emphasized the importance of proper identification of the subject plants and familiarity with the suitability of each species in all sorts of environmental situations. As examples, Dr. Chadwick mentioned that sugar maple would be evaluated much more highly in the category of species quality when it is grown in a non-urban environment. He also said that pin oak should be rated more highly when grown in an acid soil than when grown in an alkaline one.

Ray Gustin, Jr., a Maryland consulting arborist, spoke next. He encouraged the group to take steps to improve the professionalism of tree evaluators. Among the recommendations made by Mr. Gustin were suggestions that arborist consultants should be accredited and full-time evaluators and should improve their skills in the most difficult category of tree evaluation—condition. He encouraged the development of state-by-state evaluations of each tree species in each state.

Erik Haupt of Massachusetts shared with the group a review of the elaborate array of accessories he carries to tree evaluation jobs. A few of these include telephoto and wide angle camera lenses, binoculars, increment hammer and borer, Shigometer, pH and moisture meters, reference books, compass, hand saw, soil profile tube, paint, disinfectant, and pruners.

The workshop was particularly blessed by a pair of entomologists and a pair of plant pathologists who discussed a wide variety of specific tree ailments and their opinions of how the ailments would affect the value of the trees.

Don Shuder, an entomologist at Purdue University, was the first to speak. He listed many specific examples of insect problems and tree species particularly susceptible to attack. Many trees are generally free from insect attacks (e.g., Zelkova and Philodendron) and many are free from gypsy moth predation (e.g. Fraximus, Juglans, Catalpa, Juniperus, Liriodendron and Cornus). Others are not so lucky. Sunburst honeylocust is the honeylocust cultivar most susceptible to mimosa webworm. Honeylocusts in general are susceptible to a variety of problems, including mites, especially when under moisture stress, and borers. Larch sawfly can be a serious threat in the northern parts of its range but is only a minor pest in areas to the south. Lilac borers are especially a problem when the lilacs are grafted to privet roots. Red pine is especially susceptible to scale when it is grown outside of its natural range. Tulip trees, which have few pests otherwise, will occasionally have problems with tulip tree collar borer (tiny round holes at the base of the tree and apical dieback are symptomatic). Pin oak can have severe problems with obscure scale. Spruce budworm can be a severe problem when they venture away from their normal range. European pine shoot moth is a real problem on two needle pines north of the 40th parallel. Nantucket pine moth is often found on pines in xeric sites.

High nitrogen fertilization, especially ureaforms, can promote the growth of mites. Monocultures promote tremendous population growth of pests, such as walking stick in pure stands of oak in Indiana. While most galls on oaks do not seriously threaten a tree's health, horned oak gall can be very destructive. Through these few topics discussed, it seemed clear that good tree evaluators need to be familiar with a great number of variables affecting insect damage in trees.

John Weidhaas, an entomologist from Virginia Polytechnic Institute, followed with many more specifics about pests, especially sucking insects. Some examples: Oak red mites should not be considered a serious problem because they don't build up in population until late in the season and they confine themselves to the lower branches. Honeylocust plant bug injures the leaves as they emerge from bud. White pine aphid can cause bark and phloem injury that become noticeable after the aphids are gone. The damage can easily be mistaken for a canker disease. Rhododendron twig beetle is a borer which attacks only the twigs on rhododendron, leaving tiny pinholes in the bark and causing damage which can easily be mistaken for Phytophtora twig blight. Bark beetles detect and invade weakened pines before visible stress signs appear on the trees. It is therefore necessary to control the insects before a tree is obviously stressed or carefully monitor potential stresses in important trees. While peach scale has a wide range of hosts, it has become especially severe on Kwanzan cherry. Dr. Weidhaas summarized by stating that the ultimate aim is to evaluate pests before they are a problem.

Pathologists were next on the program with Spencer Davis of Rutgers being the first to speak. Dr. Davis initi-

ated his talk by pointing out a general rule of thumb concerning the degree of severity of disease problems. He noted that rusts, leaf spots, and powdery mildews are not nearly as severe as are leaf problems caused by abiotic factors. Diplodia tip blight on Austrian pine, at least in New Jersey, was one exception to his rule. Unless there was selection for resistance he would give Austrian pine a very low rating. On the other hand, disease is a much more serious problem on trunks and branches than is mechanical injury.

Concerning trunk ailments, several examples of mechanical injury to trunks (such as parking lot damage) were cited which were not considered serious, especially when the trees were callusing well. On the other hand, trunk diseases were considered to be more serious. He stated, however, that it is important to distinguish between diseases as causes of tree maladies as opposed to secondary invaders. Whether the disease is primary or secondary, many are indicators of terminal illness in trees. A tree with Fomes or *Polyporus sulphureus* or most any tree with bracket fungus with the possible exception of black locust has a real problem.

Eugene Himelick, a pathologist with the Illinois Natural History Department, spoke about wilt diseases and root problems. He outlined some of the methods of distinguishing oak wilt from other problems such as scorch. The fact that the fungus doesn't survive trips to the laboratory for culturing makes positive identification difficult. Fortunately, oak wilt is not common in urban areas and is confined primarily to the red oak subgenus. Among the other wilt diseases discussed, Verticillium wilt was given a good deal of attention. He cautioned that other problems can be confused with the disease and that only laboratory culturing can give a positive identification of the disease. For example, Phomopsis on Russian olive can be mistaken for Verticillium. Phomopsis can be pruned out, but Verticillium cannot. When discussing root problems, Dr. Himelick laid heavy blame on land developers for improper care of the soil. He noted that most root problems are symptoms of some sort of physical damage or improper care of the tree.

Next on the agenda, Bob Felix, executive vice president of the National Arborists Association, noted examples of how proper pruning and cabling can increase the value of trees while poor pruning and cabling can reduce a tree's value.

At the evening program, Elton Smith, an extension agent with The Ohio State University Department of Horticulture, discussed nutritional deficiencies and herbicide damage. On the topic of nutrition, he was mainly concerned with species which are chronically deficient and cited some species as potentially problem trees. Red and sometimes silver maple can have chronic manganese deficiencies that appear to be nitrogen problems. White oak and pin oak are notorious for iron chlorosis but river birch, star magnolia, sweetbay magnolia, sweetgum, flowering dogwood, kousa dogwood, and European birch are also susceptible to the problem. Several potentially damaging herbicides were discussed, including soil sterilants, simazine, Casoron, 2,4-D, and related products, such as dicamba, Amino Triazole, Dowpon, paraquat, and Roundup. Injury from dicamba was given special attention due to the increase in its use and the increased rate at which it is applied. Little leaf linden and sycamore were two plants listed as particularly susceptible. Cupping of the leaves and brittle margins were said to be symptomatic of dicamba damage. Taxus is perhaps the most susceptible to dicamba. On that shrub the damage looks like a late frost. Dr. Smith warned that dicamba persists in the soil and can move to and accumulate in low areas. This could be a problem particularly for golf courses. While lauding Roundup, Dr. Smith warned that if it is sprayed on basal suckers or on trunks of green barked trees it can cause damage.

The evening program was concluded with an interesting series of case histories of consulting jobs performed by Frederick Micha, consulting arborist. Mr. Micha was primarily involved in establishing the value of the damage done to trees and shrubs. In addition to reviewing the procedure he followed in each case, potential pitfalls and problem areas in the business were discussed.

The second day of talks was initiated by the return of Spencer Davis to the podium to discuss pollution damage. While noting the many types of damage done by various air pollutants, Dr. Davis felt that soil pollutants posed a more acute threat to plant material. Among the comments made about air pollution, he said that often a small percentage of trees in a population (about 7 to 10 percent) will be especially susceptible while the others are not. He recommended the removal of the susceptible members and selection of non-susceptible forms. In attempting to establish the cause of pollution damage he recommended the interesting technique of finding indicator plants. For example, when hydrogen fluoride is suspected as a cause of damage, gladioli, which are extremely susceptible, could be used to help with the investigation by serving as indicator plants. Soil pollution, unlike most air pollution, often causes the death of the affected plants. Veinal chlorosis is often evident in contrast to interveinal chlorosis in nutritional problems. On conifers the base of the needle is damaged, unlike tip damage caused by air pollution. Oil, natural gas, methane from landfills, and pentachlorophenol were some of the soil pollutants mentioned.

The conference was particularly fortunate to have Walter Shortle, a pathologist and research associate of Alex Shigo of the Northeast Forest Experiment Station in Durham, New Hampshire. Results of research done on tree wounding and the use of the Shigometer were discussed. Concepts of tree wound healing revolved primarily around the idea that trees have four types of barriers that can be established to block the progress of rotting. Ray cells which are aligned throughout the trunk of a tree in radial patterns provide one line of defense. Another line involves the dense cluster of very small cells laid down by the cambium as the seasonal growth of the tree slows to a stop. The third line of defense prevents vertical penetration by plugging the vascular system, and finally there is a barrier zone in tissue which grows over wounds. Dr. Shortle emphasized the need to respect the zones when treating a tree. He particularly noted the danger involved in cutting through a barrier and thereby permitting the spread of decay along the area of penetration and into the rest of the tree.

Use of the Shigometer for diagnosis of a tree's condition, particularly the physical structure of the trunk, was discussed next. By using the Shigometer, the existence and/or location of sapwood, heartwood, decay,

Continues on page 44

DROUGHT-STRESSED ORNAMENTALS: PROSPECTS FOR WINTER DAMAGE

By John Kerr, Associate Editor

The effects are not visible now, but by spring or early summer many plants will be showing scald and winter burn. The drought and high temperatures that hit many parts of the country last summer and fall have severely damaged ornamentals, especially evergreens. Some specimens, especially small or newly planted ones, are probably already dead.

Late autumn rainfall and cooler temperatures temporarily revived many drought-stricken plants, but research has shown the damage may be already done. A time-honored recommendation for trees, especially evergreens, has been to provide ample soil moisture prior to soil freeze-up. Work done by Dr. Harold Pellett, research director for the horticultural research center at the University of Minnesota, may prove however that fall watering after water stress is insufficient to restore plant vigor.

Dr. Pellett and his associates tested his theory on container-grown pyramidal arborvitae, *Thuja occidentalis* 'Pyramidalis.' They watered plants under a clear fiberglass roof in different increments from mid-August to early November, some at optimum conditions and others at drought conditions. Tests on freezing indicated that there were no major differences in hardiness level of plants subjected to different soil moisture treatments. In all cases, plants were incapable of tolerating temperatures which might occur on the dates tested.

In observation of visual effects, the tests showed that plants subjected to the water stress treatments suffered considerable injury, with the amount of injury proportional to the severity of the stress treatment. Rewatering of the stressed plants did not reduce the amount of visible injury exhibited regardless of date of watering. "We feel that the injury was caused as a direct result of the moisture stress, and cold temperatures contributed little if any to the injury," according to the report.

Dr. Pellett did note that late fall watering will prevent the temperature of soil from dropping as low as dry soil and this could reduce winter injury to root tissues. Yet it does little to reduce winter injury of conifer stems and leaf tissue following summer and fall droughts.

Injury was proportional to the severity of water stress, with cold temperatures contributing little if any to the injury. Without adequate summer moisture, late fall watering does little to reduce winter injury of conifer stems and leaf tissue.

"We thought that the plants were more susceptible to cold injury," Pellett says. "Plants in the greenhouse still did as badly as the ones that were kept outdoors during winter."

Dr. Charles Dunham, University of Delaware extension horticulturist concurs. "Broadleaved evergreens like azaleas, andromeda, and Japanese holly were among some of the most severely damaged plants last summer," says Dunham. "You can expect them to show considerably more injury by spring."

Narrowed-leaved and broadleaved evergreens are particularly vulnerable because they keep their foliage all winter and prepare for the winter early. They must function at a high pace from late summer through fall. All plant roots need a proper amount of moisture in the soil as the winter approaches, but research has shown that evergreens require sufficient water in their foliage at this time of year to sustain the plant through the winter.

"We haven't seen the effect yet," says Richard Weir, III, cooperative extension agent-agriculture for Nassau County, Long Island. "It is taking place internally, but we will see it in the spring." The New York Metropolitan Area experienced its driest summer ever and its third hottest summer. Weir says there are no obvious characteristics to pinpoint to a particular plant, but scorching, blotching, twig die back, and a mixture of these could appear. This causes concern among nurserymen.

Leslie Hobbs, owner of Warren County Nursery in McMinnville, TN, says the combination of drought and particularly the heat in his area hurt his stock this past year. "Evergreens were the hardest hit; the heat cooked them. It hit the viburnums, pines, spruces, and hemlocks—we lost all our one-year-old hemlocks," Hobbs says.

He doesn't think he can do much for his stock through the winter. He dug the subsoil to at least 2 feet wherever it was possible. Breaking the hardpan this deeply allows moisture to come up. He is also considering irrigating for the first time.

Nurserymen with irrigation systems have certainly faired better through the drought and heat. Wayne Lovelace, general manager at Forrest Keeling Nursery, Elsberry, MO, says his stock hasn't suffered too much. A hard ground and digging in the fall forced him to up costs of balled and burlapped stock, but shaker diggers which dig the bare root worked better in the dry ground. Weather conditions caused a slowdown in sales more than economic conditions since many customers did not feel like planting this past summer.

Lovelace warns that he is not assured yet of a good crop next spring. Much depends on the winter. "The worst thing would be severe cold with no moisture," he says. "That's what causes winter burn."

Also wary of the winter is Bill Flemer, of Princeton Nurseries, Princeton, NJ. "If the ground freezes hard, there will be serious damage," he says. "Deep freezing, cold weather, and high wind would be a bad combination."

He had trouble with his rhododendrons. They received enough water to keep them alive but not to grow. Other than rhododendrons and evergreens, which suffered considerably, there were no significant losses.

Can much be done now? "It is never too late," says Weir. "Make every effort to give mechanical protection to any broadleaved evergreens that have tendencies for scalding, winter burn, or are recently planted." Burlap or a snow fence are suggestions. Since desiccation occurs in late January, February, and March, it is time to put stakes in for burlap or caging. Weir also recommends antidesiccant materials for tender plants to prevent the loss of moisture with the warning that only one application may do more harm than good.

Weir also says it would be wise to apply nutrients very early in the spring. "Just because plants look well in April and May doesn't mean they've survived," he says.

Dr. Dunham, realizing the gravity of the situation last fall, suggested putting down a 3 to 4-inch layer of some kind of organic mulch around plants about mid-November after a thorough watering. Next spring before growth starts (early April in Delaware), prune any dead wood back to live shoots. If plants appear much weakened, give them a severe pruning.

Other advice Dr. Dunham gave to his Delaware residents was to fertilize (if still feasible in the winter) with a 10-6-4 fertilizer, with part of the nitrogen in a slow release form. Apply 2 pounds of fertilizer for each inch of trunk diameter. Half of the fertilizer can be put down in 12-inch deep holes in the area under the spread of branches. Broadcast the other half over the ground. In the spring repeat this treatment, using half of the amount broadcast over the surface. Delay pruning until next June. At that time remove all dead and dying branches.

"Some loss is inevitable after such a severe drought," says Dr. Dunham. "But with this kind of care, your plants will have a better chance at survival."

Although researchers and nurserymen seem to disagree on the severity of last summer and fall's drought, there is no argument that a dry, cold winter would be very damaging to many plants. Exactly how damaging won't be seen until spring and summer and even later for some species. The verdict is still uncertain for anyone closely watching ornamentals and Dr. Pellett is the first to admit it.

"This (the research) is not the final answer, but it gives us something to work on," he says. "Cold hardiness is a complicated area. The more information we get, the more we find out we don't know." **WTT**

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Princeton's mighty "Piggyback" has solved many of the problems that have always plagued heavy-duty, field quality material handlers. The remarkable "Piggyback" is light...strong...fast...durable...**AND** completely stable on the job!

The Piggyback will lift and load up to 4500 lbs. at a time ... turn quickly in its own length ... navigate curbs, logs, and other obstacles with ease...trudge through gravel, sand and mud, but float over normal soil...and then load itself onto your truck for a piggyback ride home at the end of the day.

How is it Possible?

The Princeton "Piggyback" provides an extremely low ratio of weight to carrying capacity...with complete stability. Stability is achieved by carrying the load weight between the drive wheels instead of in front, as with other fork lifts, and by special hydraulic stabilizer legs. Load is lifted to truck bed height, then rolled over truck bed by a horizontal carriage.

Heavy-duty high torque wheel motors allow the "Piggyback" to operate on steep grades or in adverse ground conditions and to drive easily over normal loading area obstructions while fully loaded.

The Piggyback's 28 h.p. Murphy 2-cylinder diesel provides superior power for all adverse operating conditions.

Loaded for Piggyback ride home.

For additional information or demonstration, write, or call collect:

Rodger Osborne, Sales Manager
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Dealer/Distributor Inquiries Invited

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Stop crabgrass with Dacthal®. Count on it.

Tough, hard-to-get weeds such as crabgrass and *Poa annua* are no match for Dacthal W-75 preemergence herbicide.

Fact is, Dacthal delivers effective control of more than 20 unwanted broadleaf weeds and grasses and does it better than any other herbicide. In the 20 years since it was first introduced, Dacthal has become the standard of excellence for preemergence weed control in turf.

Dacthal kills weeds as they germinate. So they never get a chance to compete with turf for nutrients, moisture and light. Turf gets all the room it needs to grow and flourish. What's more, Dacthal can be used for reliable and consistent weed control, year after year.

For getting rid of unwanted broadleaf weeds and grasses, make it Dacthal, that's all. It'll do a job for you just like it's doing for the lawn care industry.

You can count weeds out when you count on Dacthal W-75.

Diamond Shamrock

AGRICULTURAL CHEMICALS DIVISION
1100 Superior Avenue
Cleveland, Ohio 44114

Always follow label directions carefully when using turf chemicals.

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TIGHT MAINTENANCE PROGRAM KEEPS EQUIPMENT GOING IN WINTER

Courtesy of John Deere, Moline, Illinois

In extremely cold temperatures and heavy snows, it is very important to help make your equipment function properly. The following recommendations should be followed to operate equipment through the cold months. Remember to perform the regular engine preventive maintenance procedures as outlined in the operator's manual. A little extra time doing this can save valuable work time when you count on your machine to perform.

Since almost all industrial machines are powered by diesel engines, the following procedures apply:

Fuel system

— Use quality fuel that is not contaminated with water. Water in the fuel system is the greatest cause of injection system failure.

— No. 1-D fuel is recommended for use in temperatures below 40° F (5° C).

— Fill fuel tank at the end of each day to prevent condensation inside the tank.

— Do not use fuel additives or deicer containing methanol or methyl alcohol—it will not disperse in diesel fuel and can cause damage to fuel system.

— Fuel filters remove most contamination, but will not stop water. Water becomes emulsified at the transfer pump and will flow through the filter. If water is present at the fuel filter, it has likely also entered the injection system. To flush water from the injection system, drain water accumulation from fuel tank, replace the fuel filter, and operate the engine for several minutes.

— Install fuel storage tank filter to further protect engines by filtering out dirt, rust, and scale.

IMPORTANT: The filter should not be used in conjunction with fuel tank pumps of more than ⅓ horsepower (0.25 kW). Also, install a shut-off valve between the tank and filter. The filter element should be changed yearly, or more often if fuel flow is restricted.

Lubrication system

— Change oil and oil filter before cold weather arrives.

— Use proper viscosity oil recommended for use in winter operation.

Air intake system

— Inspect entire air intake system for openings that could draw in unfiltered air (loose clamps, cracked hoses, etc.).

— Inspect dry element type filters—clean or replace if clogged with dust or dirt. Inspect for damaged seams and pleats. Replace if damaged.

— If machine is to be operated in blowing snow, consider a precleaner attachment on the air intake system. This attachment prevents blown snow from entering the air cleaner element, which would result in loss of power, excessive fuel consumption, and possibly oil consumption.

Cooling system

Maintaining the proper mixture of antifreeze and water is mandatory for proper cooling system operation in subfreezing temperatures. But that alone will not provide all the protection necessary.

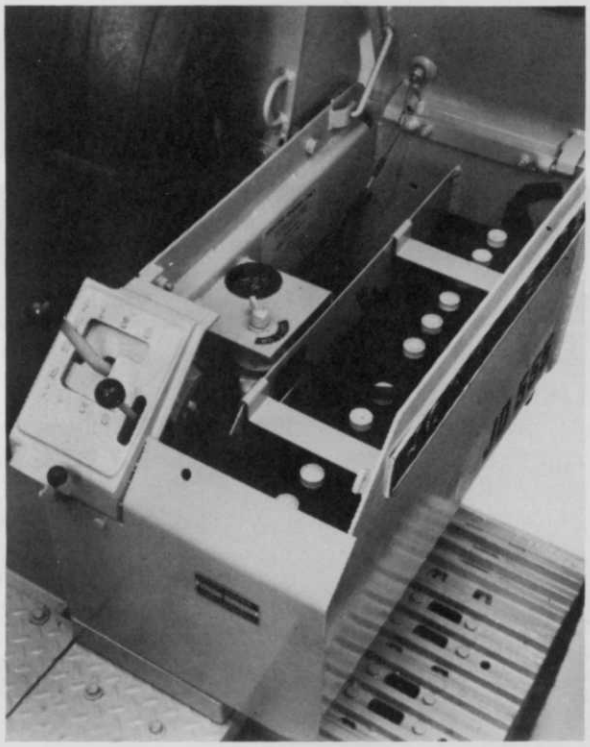
For example, continued use of the same coolant depletes the corrosion inhibitors and chemical additives. Without these inhibitors and additives, rust and scale form in the cooling system and reduce cooling efficiency. Also, cavitation erosion may occur, which can lead to early engine failure.

If antifreeze breaks down, a heavy sludge may form in the radiator. This can severely restrict water flow and result in less efficient cooling.

Before cold weather develops:

1. Drain cooling system.
2. If old coolant is dirty and rusty, clean entire system using a heavy-duty cooling system cleaner.
3. Replace radiator hoses that are cracked, soft, or swollen. Also inspect heater hoses (if so equipped) and replace if necessary.
4. Check for proper operation of thermostats.
5. Clean dirt and trash from outside of radiator to allow unrestricted flow of air. Check that radiator is clean by holding light behind the core. If light is not clearly visible through the entire area of the radiator, clean it again.

Continues on page 38



The heart of an electrical system in power equipment is the battery. It must be kept fully charged to provide maximum cranking power and prevent freezing of the battery solution.

"I wouldn't do anything to harm this tree. That's the reason I use Roundup®."

Donald Dusek
Park Superintendent, Victoria, Texas

As Donald Dusek will tell you, controlling tough weeds is just part of his grounds maintenance problem. As a park superintendent, Don is also responsible for protecting his valuable trees, shrubs and plants. So he insists on Roundup® herbicide by Monsanto.

With Roundup, Don can be confident that all of his valuable vegetation—including this beautiful 75-year-old pecan tree—can continue to flourish. He just follows label directions for Roundup. Since Roundup has no residual soil activity, and won't wash out of treated areas, Roundup helps Don control weeds in many different situations—even in his most delicate areas.

See your local Monsanto representative or chemical dealer soon for your supply of Roundup. Like Don, you'll find that Roundup is the solution to many of your toughest weed control problems.

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Nothing works like Roundup.

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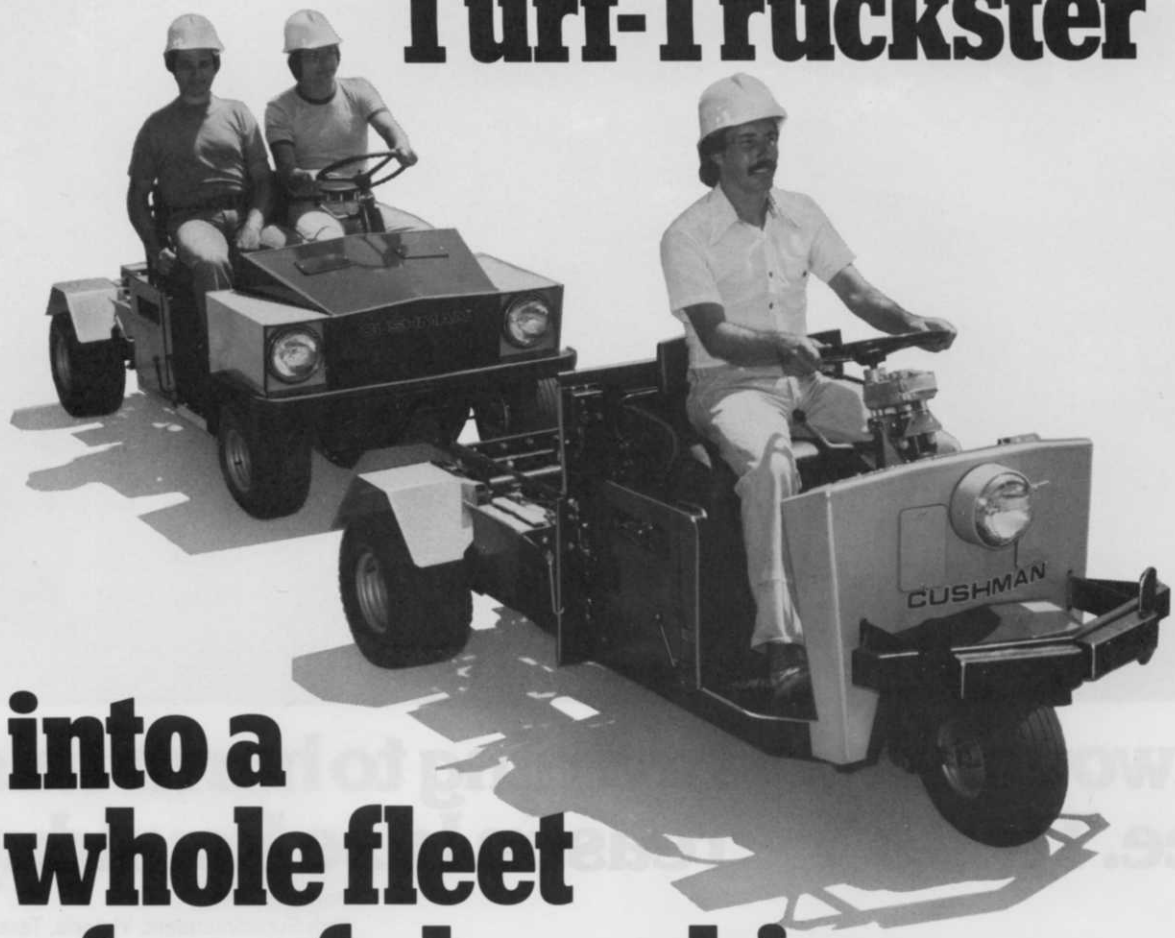
It's a snap to turn a Cushman Turf-Truckster



into a whole fleet of useful machines.

On its own, the Turf-Truckster® is an impressive way to move people, tools and equipment quickly and economically. And, as the workhorse of the Cushman® Turf-Care System, it's without equal.

Both the 3- and 4-wheel Turf-Truckster vehicles are powered by a rugged, air-cooled 18-hp OMC engine. And recent improvements help this year's Turf-Truckster deliver a 1,500 pound payload capacity.

Cushman's pin-disconnect system makes equipment attachment a snap.

What's more, in a matter of minutes, the Cushman pin-disconnect system and wide range of optional attachments can turn the Turf-Truckster into any of the specialty machines on the next page. All interchangeable. All engineered specifically for the turf-care professional.

No bolts. No hitching. No more jerryrigged trial-and-error attachments. Imagine how much time that convenience, and these accessories, could save you in the year ahead.

GREENSAVER® AERATOR

The Greensaver aerates greens, tees and other turf areas up to 10 times faster than walk-type units. Select 1/2″ or 3/8″ coring tines (both coring drums will collect cores as you aerate) or slicing tines to match your turf.

TOP DRESSER

Compared to self-powered or walk-type top dressers, this unit quickly pays for itself in saved manhours. A rubber fabric moving bed and rotating brush are matched to the vehicle's ground speed governor for an evenly spread 31 1/2″ swath. The clutch control, to engage spreader, can be operated from the driver's seat. And the hopper holds up to 1,000 pounds of material.

SPRAYER

With optional 15′ boom and handgun, this attachment is ideal for spraying greens, trees, bushes or roughs quickly and accurately. Powered by the Turf-Truckster vehicle's optional PTO, and equipped with ground speed governor, calibration is easy and thorough. The 100-gallon tank means fewer refilling stops.

POWER CONVERTER

The Cushman Power Converter is an inexpensive way to turn your Turf-Truckster into a mobile power plant for electric tools, floodlights . . . anything with a universal motor that draws up to 12 amperes at 120 volts DC. So instead of bringing small repair jobs back to the shop, your crew can handle them in the field.

SHORT BOX & FLATBED BOX

Your Turf-Truckster becomes a flatbed hauler with just two pull pins in place. Bolt on the optional side panels and tailgate to the flatbed, and you have a 1,500 pound capacity* box that can be dumped manually or hydraulically.

SPREADER/SEEDER

Mounted on the optional Short Box or Flatbed/Box, its cyclone action broadcasts as much as 300 pounds of seed, fertilizer or other material over a 40′ wide area. The Spreader/Seeder is powered by the Turf-Truckster vehicle's optional PTO with extension shaft. And the controls are operated from the driver's seat.

QUICK AERATOR

With its 46″ swath, this attachment earns its name by finishing big aerating jobs fast. By hydraulically lifting it into transport position from the driver's seat,** you can move quickly from job to job, too. Choose from three tine styles, slicing, coring (2 sizes) and open spoon.

To find out more about how the Cushman Turf-Care System can make your work force more productive, ask your Cushman Turf Dealer for an on-turf demonstration soon. For the name of your nearest dealer, call Cushman Information at 402-435-7208.

*Rating for vehicle equipped with 9.50-8 rear tires.

**Optional hydraulic system and dump set required.

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CUSHMAN®

The Labor-Saving Turf System

1024 Cushman, P.O. Box 82409, Lincoln, NE 68501, 402-435-7208

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81-CUT-1R

6. Check baffles around radiator and fan shroud to see that they are in place and functional.

7. Fill cooling system with proper mixture of clean water and permanent antifreeze with ethylene glycol base. Mixture should be adequate to protect to the lowest temperatures expected. Do not use antifreeze with stop-leak or sealer additives.

8. If engine is equipped with coolant conditioner filter, perform service as recommended in operator's manual.

9. Inspect belts and replace those showing damage and excessive wear. Check for proper belt tension to assure proper coolant and air flow.

Electrical system

The battery is the heart of the electrical system. Typical batteries contain a number of individual cells enclosed in a hard rubber or plastic case. These cells are made up of a series of positive and negative plates with plate separators. Plate straps, welded to a number of similar plates, form positive and negative plate groups.

Dry-charged batteries come from the factory with no electrolyte added to the cells. Wet-charged batteries contain an electrolyte solution. The electrolyte is a solution of sulfuric acid and water, and a dry-charged battery becomes wet-charged when electrolyte is added.

A chemical reaction between the battery's plates and the electrolyte converts chemical energy into electrical energy. The reaction causes positive and negative charges of electricity to build up on their respective positive and negative plates. Battery cells reach a fully charged condition because of the electrolyte interaction with plate material: the longer the interaction, the greater electrical charge on each plate.

When the battery is connected to a complete circuit, current begins to flow from the battery and the discharge cycle begins. After batteries experience a number of charge-discharge cycles, or become discharged, they should be tested.

Typical tests include:

- Visual inspection — for general condition
- Specific gravity test — for battery charge
- Light load voltage test — for comparing cell voltages
- High rate discharge test — for internal conditions

Batteries that are questionable after any of these tests should be either recharged or replaced. Generally if all cells test the same, the battery is good. If all cells test low, recharging is usually all that is required.

If there is a real difference between cells, the battery generally must be replaced. The electrolyte specific gravity should be 1.270 at 80° F (27° C). This means it weighs 1.270 times more than water. For every 10° F (6° C) above 80° F add four gravity points (0.004), for every 10° F below 80° F subtract four gravity points (0.004). Specific gravity should not vary more than 0.050 between all cells. Voltages should not vary more than 0.050 volts between all cells under a light load test.

Battery efficiency is greatly affected by temperature. The point is—keep the battery fully charged. A half-charged battery at 0° F (-18°C) provides very little useful cranking power; its performance will be only approximately 20 percent of a fully charged battery. Battery charge must also be maintained to prevent freezing of the battery solution during cold weather.

The electrical charge of a battery can be restored by sending a direct current through the battery (from an outside power source) in a direction opposite to the direction of discharge. The reverse flow rebuilds the electrical charges on the plates.

Batteries are usually recharged automatically by the battery charging alternator or generator operated by the engine.

Stored, wet-charged batteries should be recharged at least every 30 days. If not, the effects of self-discharging and sulfate-crystal buildup on discharged plates can cause enough damage that the battery can never be restored to a normally charged condition.

Preventive maintenance can be the determining factor in whether a battery starts an engine. The following maintenance suggestions also may lead to longer battery life.

1. Proper mounting eliminates most battery vibrations. Continuous vibration loosens battery plates, wears holes in separators, and cracks the case and cover.

Secure mounting in hold-down trays with plates at right angles to the direction of movement eliminates most vibration damage. Overtightening of hold-down brackets, however, can put undue strain on the case and cause it to crack.

2. Clean battery connections permit better charging and easier starting. Use cleaning tools to remove corrosion and brighten connectors.

Clean the battery case with a baking soda-water solution. Apply this solution until foaming stops and then rinse with water. Make sure no solution enters the battery cells.

3. Electrolyte should always be visible above the plates. Constant overcharging results in low electrolyte level, and plates tend to deteriorate rapidly. Also, added stress is placed on the generator or alternator.

Overfilling results in electrolyte seepage from vent holes in filler caps, possibly causing equipment parts to corrode and rust.

4. Overcharging can warp plates and cause bubbling and loss of water in the cells. Active material bubbles from the plates and reduces battery capacity. A symptom of overcharging is a battery that uses an excess amount of water with no apparent leaks in the case. The specific gravity of the electrolyte will indicate battery charge.

Undercharging causes formation of a sulfate coating on battery plates. This sulfate inhibits the conversion of chemical energy to electrical energy and, therefore, permanently weakens the battery.

The heart of the electrical system stimulates the other parts of the system. Proper care and maintenance of batteries results in longer battery life and better performance.

Hydrogen gas present in all lead-acid batteries is

Continues on page 42

IN 4 YEARS OF TESTING, NOTHING EVEN CAME CLOSE TO CHIPCO® RONSTAR® G FOR GOOSEGRASS CONTROL.*

INTERVAL	CHIPCO® RONSTAR® G	BALAN	DACTHAL	BETASAN
101-150 days	94%	61%	45%	37%

The only turf care professionals who still think goosegrass is hard to control are the ones who haven't tried Chipco Ronstar G herbicide yet. The ones who have tried it will tell you it does a great job, even 200 days after application. And that it's effective against crabgrass and poa annua, too.

Got a goosegrass problem? Get the most effective, longest lasting pre-emergent goosegrass herbicide there is: Chipco Ronstar G. Rhône Poulenc Chemical Company Agrochemical Division, Rhône Poulenc Inc. Monmouth Junction, New Jersey 08852.

RHÔNE-POULENC

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Please read label carefully, and use only as directed.

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When the top 9 of 10 lawn care firms in America all choose DURSBAN* brand insecticides as their predominate insecticides for surface insect control...there has to be a good reason. Or two.

Well there are two.

1. DURSBAN insecticides last longest of all leading insecticides.
2. DURSBAN insecticides cost less to use than other leading insecticides.

In fact one application of DURSBAN 4E, ¾ oz. per 1,000 sq. ft., costs only about 45¢. Yet with this small amount, you get six to eight weeks of unsurpassed residual control of dozens of turf pests. Compare this to two to four weeks with any of the other leading insecticides.

And although DURSBAN insecticides are highly effective against insects, they are kind to turf, to people and to pets.

You also use a lower dosage rate with DURSBAN than with other leading insecticides. That means you handle fewer drums to do the job.

So ask your supplier for the turf insecticide that saves you time, trips, storage space and money. Ask for DURSBAN 2E insecticide or double-strength DURSBAN 4E insecticide. Just be sure to read and follow all label directions and precautions. Agricultural Products Department, Midland, Michigan 48640.

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highly explosive. And if the battery electrolyte level is low, larger quantities of hydrogen gas can become trapped in the space above the electrolyte in each cell. The slightest spark can cause an explosion. You could be injured by the explosion and also sprayed with the sulfuric acid electrolyte.

Here are five steps to use when connecting a booster battery:

1. Remove cell caps from both batteries to allow hydrogen gas to vent. Important: Ensure that both batteries are of the same voltage.
2. Connect one end of the first jumper cable to positive (+) terminal of the booster battery and the other end to the positive (+) terminal of the weak battery. When connecting positive (+) to positive (+), be sure not to touch the other end of the cable to any part of the machine, or battery damage may result.
3. Connect one end of the second jumper cable to negative (-) terminal of booster battery.
4. Connect the other end of the second cable to the starter ground or to the machine frame well below level of the battery. (If this is not possible, make this last connection as far from the battery as possible.) Then if a spark is produced at this connection, it will occur below any hydrogen gas escaping from the battery.

NOTE: For added safety, lay a piece of heavy nonconductive material over top of battery.

5. Disconnect batteries in just the opposite order. Remove the second cable from where it was last connected as described in Step 4.

Engine coolant heater

A coolant heater may be installed to aid starting in cold weather. When the heater is connected to an electrical outlet, the coolant is heated and keeps the engine warm for easier starts in extremely cold weather.

Remember, an engine block heater heats only the coolant, not engine oil. After starting the engine, allow sufficient time for oil to warm to operating temperature before placing engine under full load.

Other major components of the machine must be ready to function in the cold temperatures as well as the engine. Here are some suggestions for winterizing these other systems.

Winter work can be stunted and halted if equipment has not been checked and properly maintained.

Transmission

— Inspect transmission for external leaks and repair as necessary.

— Drain oil and refill with specified new oil. Use winter grade oil if required for specific applications. Also, change transmission oil filters.

— Examine the oil and filter for signs of contamination or metal particles that would indicate damage somewhere in the machine. Contact your dealer for assistance in determining the extent of damage and repair that will be required.

— Check the condition of hoses, steel lines, and connections.

— Make sure the transmission, reverser, and axle assembly breather are open. If there is an indication of excessive oil carryover out the breather (oily dirt around the breather), clean the breather.

On machines equipped with drive-line brakes:

1. Check for oil leakage on drive-line mounted brake.
2. Adjust brake actuating linkage.
3. Lubricate linkage and lever to prevent binding and rusting.
4. Replace brake friction element if excessively worn.

Hydraulic system

— Examine system for external leakage—repair or replace components as necessary.

CAUTION: Use a piece of cardboard or wooden guard when inspecting for high-pressure hydraulic leaks. Fluid is under pressure that is great enough to penetrate skin and cause severe injury.

— Drain hydraulic oil. Check for excessive contamination and metal particles. If present, determine the source of the contamination and correct the problem.

— Install new hydraulic oil (winter grade if recommended) and new filter.

— Check pressure cap (if so equipped) for proper operation.

— Inspect hoses and tubes for deterioration, kinks, and/or damaged fittings.

— Check position and tightness of clamps.

— Clean breather assembly if dirty.

— After starting engine, warm up hydraulic system to obtain normal function speeds by operating functions through complete cycles. When a function reaches the end of its cycle, continue to hold the function control in that direction for a few seconds (relief valve opens). This procedure is for machines with open center system only.

IMPORTANT: Do not hold function control more than 10 seconds after function reaches the end of a cycle or valve spool may heat up and stick in valve bore.

Attachments

— Grease pin joints at end of shift when joints are warm and take grease easier. If pins will not take grease, remove and clean grease fittings and grease passage.

— Replace worn pins and bushings.

Continues on page 44

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A new concept in slow release fertilizers to give you high performance at an economical cost.

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Estech General Chemicals Corporation,
Professional Products Division,
P.O. Box 1996 Winter Haven, FL 33880

*Registration Pending

par ex®
PROFESSIONAL PRODUCTS

EQUIPMENT *from page 42*

— Tighten loose hardware on attachment mounting structure.

Antifreeze

In cold weather, cooling systems must be protected by adding antifreeze—usually an ethylene-glycol type. When extremely cold weather is expected you might think the more ethylene-glycol antifreeze you add, the lower the freezing point of the coolant. Not so!

The lowest freezing point obtainable is when the water-antifreeze solution contains about 67 percent antifreeze (protects to -94° F, -70° C).

General inspection

Some miscellaneous items should be inspected if equipment is to be operated in winter weather.

— Check tires and rims for damage. A tire with a rim that was nicked or bent during the summer may retain air during warm weather but leak in subzero temperatures. Replace or repair damaged tires or rims as necessary.

— Replace broken windows and seals around doors and console (cab equipped machines). Snow that enters control areas could cause icing as temperatures fluctuate. Cold air results in operator discomfort.

— Make sure brake lights, turn signals, rotating beacon, and warning lights operate properly if machine is to be used for snow removal.

— Check operation of heater (if so equipped). Since heater is not used during summer, controls may corrode or bind up and heater will not function properly when needed.

EXPERTS *from page 29*

and hollowness can be detected. Even relative growth rates can be measured. Dr. Shortle emphasized that the most difficult aspect of using the Shigometer is interpreting the results. Only by understanding how the relative conductivity and not the absolute conductivity varies can the readings be properly interpreted.

The afternoon session of the second day turned to the mechanics of tree evaluation. James Kielbaso of the Department of Forestry at Michigan State University quickly outlined the procedures to be followed. The entire group then went outside and made practice evaluations of six trees in the Ohio State University Campus. A thorough discussion of the results occupied the morning hours of the next day.

On the evening of the second day, Jack Siebenthaler, horticultural consultant, discussed nursery appraisal. Through case histories, Mr. Siebenthaler gave the audience an idea of the type of problems involved and the methods he used to make a usable and accurate evaluation. **WTT**

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Employers! You can get a tax credit of up to $3,000 each time you hire a worker eligible for the Targeted Jobs Tax Credit. It's easy. Contact Job Service or IRS for details.

Targeted Jobs Tax Credit

Prepared as a public service by the U.S. Department of Labor and the Internal Revenue Service.

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Another Brouwer innovation in material handling

- Simple, safe operation
- Very lightweight design
- Excellent performance on all terrain
- Quick hook-up and release to any truck
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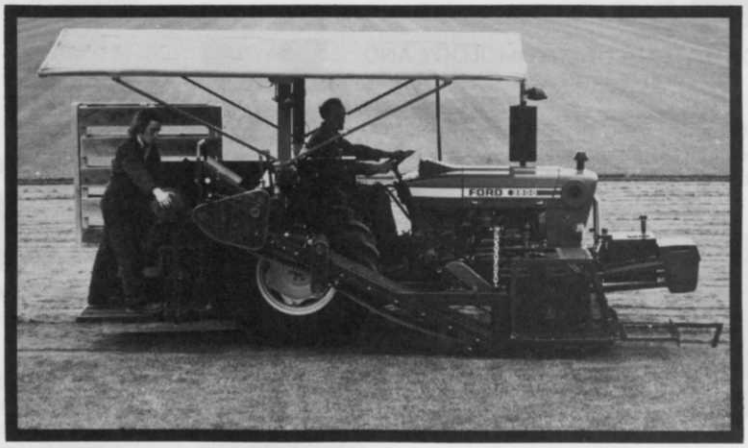
- Cut, Roll, Slab or Fold 24 hours a day, wet or dry weather, all sod, all conditions.

Top Turf men around the world use Brouwer Harvesters to assure top profit.



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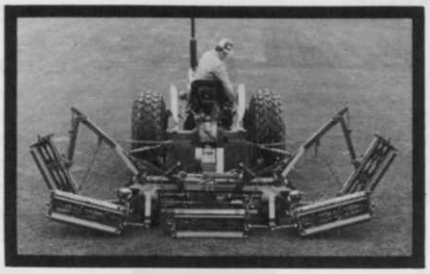

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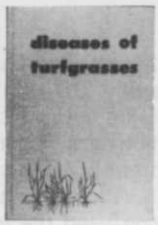

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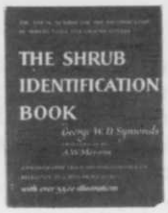

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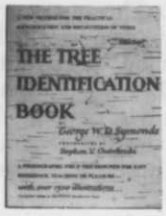

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SOIL

Workshop gives tips on seedling propagation

A five-day workshop on North American Forest Tree Nursery Soils provided close to 200 nurserymen information on how to grow better seedlings faster and at a lower cost through soil analysis and management.

Nurserymen from the U.S., Canada, and Europe heard a variety of topics from 21 speakers at the sessions, which were arranged by the State University of New York College of Environmental Science and Forestry (ESF) in Syracuse, NY. The topics were grouped into two categories: biological factors of mycorrhizae, diseases, insects, seedling quality, and composition; and nutritional and soil chemical factors of fumigation, nutrition, fertility, and soil reaction.

The workshop also included a small dedication and tree planting memorial to Albert Leaf, ESF professor who pioneered most of the recent work in nursery soil testing and analysis.

Earl Stone, professor emeritus at Cornell University, summarized the workshop's four main objectives in a final speech: to help sharpen and understand applied biology, chemistry, and soil science involved in growing tree seedlines; to develop a more exact idea about the multiple effects that individual treatments may have, or interact with each other, in effects on plant growth; to suggest how to calculate, monitor, and control soil, water, and nutrition availability to a greater degree than often done; and to systematically examine each step, operation, and material input of the nursery program with a view to what it contributes to production, efficiency, cost, and stock quality.

Proceedings of the workshop are being published. Those interested in obtaining copies should write: Dr. Donald Bickelhaupt, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210.

PESTICIDES

EPA clears confusion around ban on lindane

The Environmental Protection Agency has cleared the wording of its proposal to ban the pesticide lindane to allow its continued use by commercial applicators.

Although the final outcome in the controversy surrounding lindane will not be published until next October, the Special Pesticide Review Division's projected date, the division says certified applicators will not be barred from using it. Position Document 2/3, which was published July 3, 1980 in the Federal Register, had confused the issue of whether commercial or homeowner use was affected. The words, "commercial ornamentals," were used to describe applicators.

Zoecon Corp., a major supplier of the pesticide in the United States, evaluated EPA's initial investigation and conducted their own. The company arrived at different conclusions, which makes it seriously question the benefits against the risks. The EPA held an independent scientific advisory council, which can only advise, and recommended the use of lindane be retained.

Bob Felix, executive vice president of the National Arborist Association, met with members of the EPA to help clarify the wording of the proposal and said they were more than receptive to his suggestions. Arborists, who use lindane for borer control on oaks, ash, rhododendrons, birch, and lilacs, would not mind if it was taken out of the hands of homeowners. "If you get more homeowners out of pesticides," Felix says, "everybody will be safer."

The EPA officially closed comments toward lindane on September 15, but would still like to receive them if they contain scientific data or methods for reducing exposure. Write: Document Control Office (TS-793), Room E-447, Office of Pesticides & Toxic Substances, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460.

COMPANIES

Lakeshore Equipment hires product manager

Lakeshore Equipment and Supply Company recently hired Jack Bruns as its new product development manager for irrigation in Elyria, Ohio, and Dante Brunetti to head its nursery sales organization in Florida.

Bruns, former superintendent at the Youngstown, Ohio, Country Club, is a horticulture graduate of Iowa State University with specialization in turfgrass management and aboriculture.

Brunetti, an agricultural graduate of the University of Massachusetts, has 24 years' experience in production and marketing of nursery, fertilizer, and chemical materials.

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VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *What is the latest information on the control of Cytospora canker in blue spruce?*

A: Cytospora canker is caused by the fungus *Cytospora Kunzei* and is most often associated with older and/or weakened trees. Improving tree vigor has been and still is the recommended treatment. This includes proper fertilization, watering, soil improvement and pruning. Pruning tools should be sterilized to minimize the potential for spreading the disease, and pruning should never be done during wet weather.

Q: *Where can I get a list of crabapples resistant to scab and fire blight.*

A: Write to Dr. L. P. Nichols, Pennsylvania State University, 211 Buckhout Laboratory, University Park, Pennsylvania 16802.

Q: *What causes gummosis on cherry trees?*

A: Gummosis is simply the oozing of sap (including gum and latex) from a wound or other opening in the bark. It often results from borer infestations.

Q: *I have been reading about the adverse effect an alkaline pH has on pesticide solutions. Are there any products on the market that can be used to adjust the pH?*

A: Sorba-Spray, produced by Leffingwell Chemical Company in Brea, California, and Spray-Aide, produced by Miller Chemical and Fertilizer Corporation in Hanover, Pennsylvania, will lower the pH of tank mixes.

Q: *I know that the presence of certain weeds in a lawn can be used to diagnose soil problems. Can you tell me what these weeds are and the related soil condition?*

A: Most weeds can grow under a wide variety of soil and environmental conditions but certain weeds may become dominant under adverse conditions because of their tolerance. For example, moss will grow in almost any soil in either shade or full sun. However, it is usually associated with excess moisture, shade and acid soils because it is tolerant of these conditions, and thus, more competitive. Such plants are known as *indicator weeds* because their presence indicates — but does not assure — certain growing conditions.

I have listed the most common indicator weeds for your area (Northeast) and the condition(s) under which they may dominate. You should test the soil for confirmation.

	SOIL CONDITIONS						
Indicator Weed	Infertile	Moist	Dry	Acid	Compaction	Sandy	SHADE
annual bluegrass *(Poa annua)*		•			•		•
common chickweed *(Stellaria media)*		•					
cinquefoil *(Potentilla simplex)*	•						
ground ivy *(Glechoma hederacea)*							•
heal-all *(Prunella vulgaris)*		•					•
carpetweed *(Mollugo verticillata)*	•		•	•			
knotweed *(Polygonum aviculare)*					•		
moss *(Bryum, Ceratodon, Hypnum or Polytrichum spp.)*		•					•
orange hawkweed *(Hieracium aurantiacum)*	•			•			
oxeye daisy *(Chrysanthemum leucanthemum)*	•			•			
povertygrass *(Danthonia spicata)*	•						
rabbitfoot clover *(Trifolium arvense)*			•			•	
rough bluegrass *(Poa trivalis)*		•					•
sandbur *(Cenchrus pauciflorus)*	•		•			•	
sheep sorrel *(Rumex acetosella)*	•		•	•			
smartweed *Polygonum persicaria)*		•					
thyme-leaved sandwort *(Arenaria serpyllifolia)*			•			•	
trailing stonecrop *(Sedum sarmentosum)*		•					
violets *(Viola spp.)*		•					•
yarrow *(Achillea millefolium)*	•		•				

Send your questions or comments to: Vegetation Management c/o WEEDS TREES & TURF, 757 Third Avenue, New York, NY 10017. Leave at least two months for Roger Funk's response in this column.

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SOD PRODUCER NEWS

Robinson named vp of marketing for Pickseed

Mike Robinson, a nine-year veteran of the Northwest seed industry, has been named vice president of marketing for Pickseed West, Inc., Tangent, OR.

In the past two years, Robinson has introduced Pickseed proprietary products in numerous markets throughout the United States. Most recent varieties introduced include Fiesta, Dasher, and Blazer Perennial Ryegrass, and America Kentucky bluegrass.

Robinson will continue to be responsible for the company's proprietary marketing turf and forage seed. His other major responsibility is coordinating Pickseed's research and variety development.

Turf Seed introduces chewings fine fescue

Shadow, a new variety of chewings type fine fescue, is being marketed by Turf Seed, Inc., Hubbard, OR.

Dr. William Meyer of Turf Seed developed Shadow after working with many germ plasm sources. It has shown good resistance to powdery mildew and rust *(Puccinia carandallii)*.

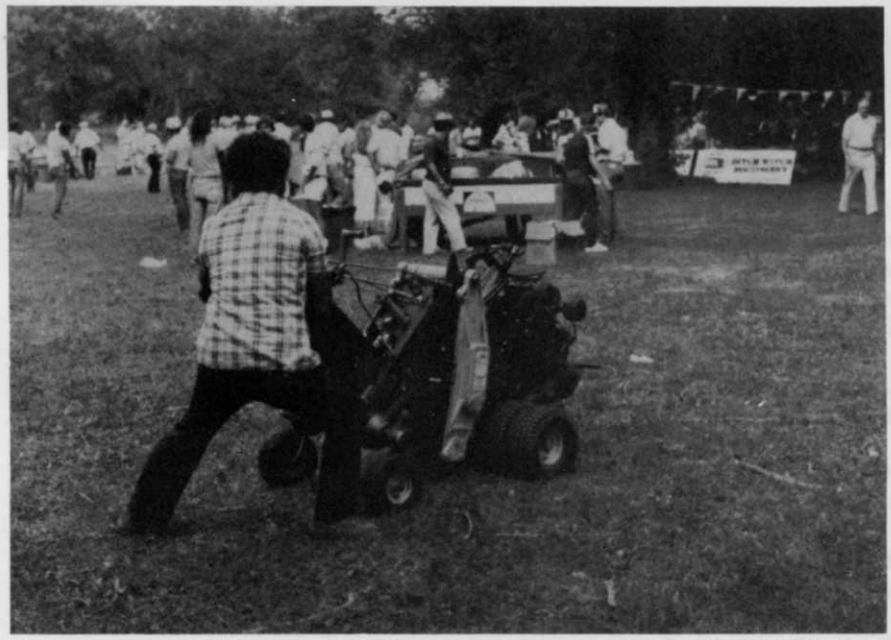
Shadow has a medium dark green color with leaf width similar to Banner or Jamestown and with similar performance and heat tolerance.

Lofts hosts 400 at annual field day

More than 400 golf course superintendents, park managers, sod growers, county agricultural agents, automated lawn dealers, and landscape architects attended the 4th annual Lofts Pedigreed Seed field day at its Martinsville Research Farm.

After observing Lofts' plots, attendants heard a slide presentation demonstrating the various aspects of seed production accomplished within Lofts' facilities. This was followed by a plant disease clinic held by Dr. Noel Jackson of the University of Rhode Island. Richard Hurley, Lofts' director of research, showed overseeding equipment and practices. Other discussions included *Fusarium roseum* control and fall fertilization.

The company also has published its new "Guide to Seed & Sod in the U.S.," a concise reference to various turf varieties and their adaptations, recommended uses, planting rates, and dates. It is available free of charge from: Lofts Pedigreed Seed, Inc., Bound Brook, NJ 08805, 201/356-8700.



Reed's Sod Farm was the site for the Sixth Annual Field Day of the Irrigation Association of New Jersey in October. The Princeton, New Jersey, farm hosted more than 300 irrigation contractors, golf course superintendents, lawn care managers, and Rutgers University staff. Users were able to see demonstrations and discuss problems with dealers, distributors, and university specialists.

Perennial ryegrass gets Canadian license

Omega, a new fine-textured moderately dark green turf-type perennial ryegrass, has been awarded a Canadian license by Agriculture Canada, Plant Products Div. in Ottawa on an application by Oseco Inc. of Brampton, Ontario.

Omega, a 32 clone synthetic variety, was developed by Turf-Seed Inc., Hubbard, OR. It has been tested at a number of official stations in Canada since 1976 and has proven to be a versatile turf-type perennial ryegrass suitable for a variety of climates.

ASPA winter show will include exhibits

Equipment and services, always a popular part of the American Sod Producers Association summer meeting, will become an additional feature to the group's winter meeting in Lake Tahoe.

Exhibits will be on display from beginning to end of the conference at Tahoe's Sahara Hotel, February 16-18. They will share the spotlight with two full days of speakers and topics of technical and practical nature.

Program Chairman Steve Cockerham of Rancho Verde Turf Farms, Perris, CA, says that there will be sessions on hydro-mulching, stolens versus sod, and warm and cool season grasses. Dr. Victor Gibeault from the University of California will speak on energy and water; Jerry Faulring, president of the Professional Lawn Care Association of America, will talk about cooperation between sod growers and the lawn care industry; and Attorney William Harding will explain how to deal with state agencies.

Other topics concern income and estate planning and positive alternatives to unions and organized labor. For more information, contact: American Sod Producers Association, Association Building, 9th & Minnesota, Hastings, NE 68901, 402/463-4683.

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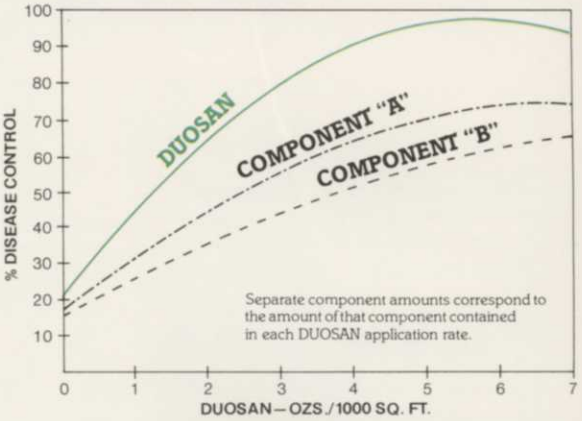

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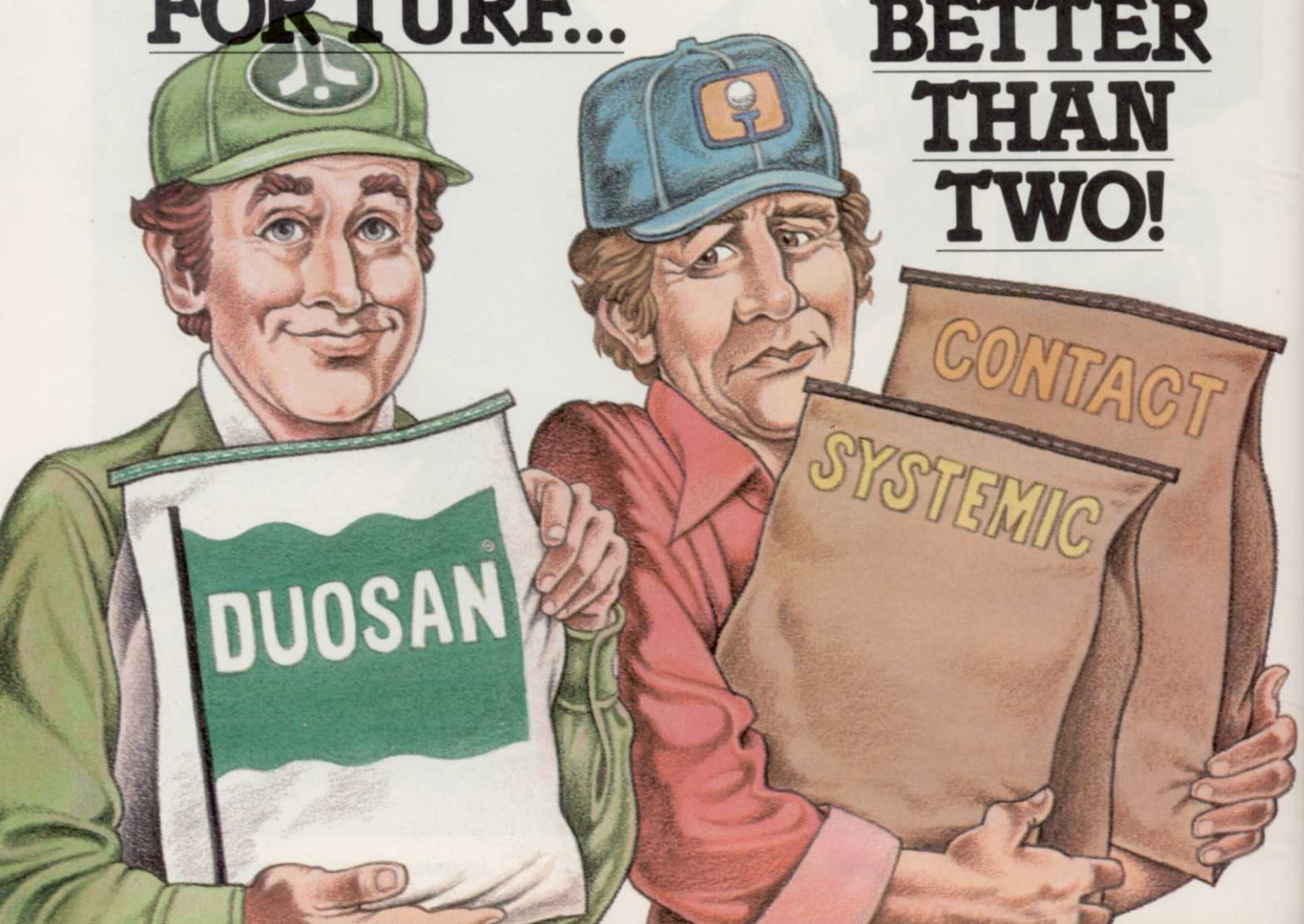

WT&T EVENTS

The current issue of WEEDS TREES & TURF carries meeting dates beginning with the following month. To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 757 Third Ave., New York, NY 10017.

Basic Short Courses in Horticulture by the California Association of Nurserymen and Univ. of CA, Brentwood Theater, Veterans Administration, West Los Angeles, CA, **Jan. 20 & 27 and Feb. 3, 10, & 17;** Buena Park Hotel, Buena Park, CA, **Jan. 21 & 28 and Feb. 4, 11, & 18;** Rancross Square, Riverside, CA, **Jan. 22 & 29 and Feb. 5, 12 & 19.** Contact Ed McNeill, Registration Coordinator, Horticultural Education Fund, 1000 Concha St., Altadena, CA 91001, 213/798-1715.

Landscape/Garden Center Management Clinic, Galt House, Louisville, KY, **Feb. 1-4.** Contact Ray Brush, Administrator, National Landscape Association, 230 Southern Building, Washington, DC 20005, 202/737-4060.

26th Annual Southwest Park and Recreation Training Institute, Lake Texoma Lodge, Kingston, OK, **Feb. 1-4.** Contact James W. Kitchen, Institute Director, Texas Tech Univ., Dept. of Park Administration & Landscape Architecture, P.O. Box 4169, Lubbock, Texas 79409, 806/742-2858.

The Irrigation Association Short Course, Lubbock, TX, **Feb. 3, 4 & 5.** Contact The Irrigation Association, 13975 Connecticut Ave., Silver Spring, MD 20906, 301/871-1200.

Basic Short Course in Horticulture, Brentwood Theater, Veterans Hospital, West Los Angeles, **Feb. 3, 10,** and **17;** Buena Park Hotel, 7675 Crescent Ave., Buena Park, **Feb. 4, 11,** and **18;** Raincross Square, 5th and Market Streets, Riverside, **Feb. 5, 12,** and **19.** Contact Ed McNeill, Registration Coordinator, 1000 Concha St., Altadena, CA 91001, 213/798-1715.

Wisconsin ISA chapter meeting, Olympia Hotel, Oconomowoc, WI., **Feb. 8-9.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/328-2032.

Michigan ISA chapter meeting, Kellogg Center, Michigan State Univ., E. Lansing, MI, **Feb. 11-12.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/320-2032.

A.L.C.A. Annual Meeting & Trade Exhibit, Hyatt Regency Hotel, New Orleans, LA, **Feb. 8-13.** Contact Associated Landscape Contractors of America, 1750 Old Meadow Rd., McLean, VA 22102, 703/821-8611.

2nd Annual Agri-Turf Irrigation Exposition and Technical Conference, Salt Palace, Salt Lake City, UT, **Feb. 15-18.** Contact The Irrigation Association, 13975 Connecticut Ave., Silver Spring, MD 20906, 301/871-1200.

National Arborist Association Annual Meeting, Sarasota Hyatt House, Sarasota, FL, **Feb. 15-19.** Contact Robert Felix, Executive Vice President, 3537 Stratford Road, Wantagh, NY 11793, 516/221-3082.

Capital Area Turf & Ornamental School, Lancaster Area, **Feb. 18-19.** Contact Harold E. Stewart, Dauphin County Cooperative Extension Service, 75 South Houcks Street, Suite 101, Harrisburg, PA 17109, 717/652-8460.

Maryland Nurserymen's Day, Maryland Flower Growers' Day, and Landscape Contractors Day, Center of Adult Education, University of Maryland, College Park, **Feb. 17, 18,** and **19.** Contact Conrad B. Link, Professor, Dept. of Horticulture, University of Maryland, College of Agriculture, College Park, MD 20742, 301/454-3606.

WSSA annual meeting, Dunes Hotel and Country Club, Las Vegas, NV, **Feb. 17-19.** Contact Weed Science Society of America, 309 West Clark St., Champaign, IL 61820.

American Sod Producers Association Midwinter Conference, Harrah's, Lake Tahoe, NV, **Feb. 23-25.** Contact Bob Garey, ASPA Executive Director, 9th and Minnesota, Hastings, NE 68901, 402/463-4683.

Connecticut Groundskeepers Assoc. Conference, Hartford Civic Center, Hartford, CT, **Feb. 25.** Contact Connecticut Groundskeepers Assoc., P.O. Box 3916 Amity Station, New Haven, CT 06525.

Residential Landscape Design Short Course III, Fisher Auditorium, Ohio Agricultural Research and Development Center, Wooster, OH, **Feb. 25-27** Contact Fred Buscher, Area Extension Agent-Landscape Horticulture, Administration Building, OARDC, Wooster, OH 44691, 216/262-8176.

Penn-Del ISA chapter meeting, Holiday Inn, King-of-Prussia, PA, **Feb. 26-27.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/320-2032.

Southern ISA chapter meeting, Sheraton (not finalized), Charlotte, NC, **Mar. 1-4.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801.

Pennsylvania Turfgrass Conference & Trade Show, Hershey Lodge & Convention Center, Hershey, PA, **Mar. 2-5.** Contact Christine E. King, Executive Secretary-Treasurer, Pennsylvania Turfgrass Council, 412 Blanchard Street, Bellefonte, PA 16823, 814/355-8010.

The Irrigation Association Short Course, Pasco, WA, **Mar. 3-4-5.** Contact The Irrigation Association, 13975 Connecticut Ave., Silver Spring, MD 20906, 301/ 871-1200.

Southeast Region Parks and Recreation Maintenance Operations workshop, Unicoi State Park, **Mar. 8-13.** Contact Charles Gregory, Recreation Advisor, Recreation Services Section, Georgia Dept. of Natural Resources, 270 Washington Street, S.W., Room 704, Atlanta, GA 30334.

The Irrigation Association Short Course, Lansing, MI, **Mar. 10-11.** Contact The Irrigation Association, 13975 Connecticut Ave., Silver Spring, MD 20906, 301/871-1200.

Northeastern Pennsylvania Turf & Grounds Maintenance School, Master Host Motel, Wilkes-Barre, PA, **Mar. 10-11.** Contact E.V. Chadwick, Luzerne County Cooperative Extension Service, Court House Annex, 5 Water Street, Wilkes-Barre, PA 18702, 717/822-1109.

Residential Landscape Design Short Course IV, Fisher Auditorium, Ohio Agricultural Research and Development Center, Wooster, OH, **Mar. 16-17.** Contact Fred Buscher, Area Extension Agent-Landscape Horticulture, Administration Building, OARDC, Wooster, OH 44691, 216/262-8176.

Continues on page 56

5th Turf Conference of Reinders Brothers, Inc., Waukesha Expo Center, Waukesha, WI, **Mar. 18-19.** Contact Ed Devinger, Reinders Brothers, Inc., 13400 Watertown Plank Road, Elm Grove, WI 53122, 414/786-3300.

Irrigation Association's Institute for Agricultural Irrigation, University of California-Riverside, **Mar. 23-Apr. 3.** Contact the IA, 13975 Connecticut Ave., Silver Spring, MD 20906.

The California Landscape Contractors Associations' second annual Landscape Industry Show, Convention Center, Long Beach, CA, **Mar. 26-27.** Contact Michael Leeson, CLCA, 1419 21st St., Sacramento, CA 95814, 916/448-2522.

Canada ISA chapter meeting, Holiday Inn City Centre, London, Ontario, **Apr. 1-3.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/328-2032.

Annual Meeting of the American Boxwood Society, Blandy Experimental Farm, Boyce, VA, **May 14.** Contact The American Boxwood Society, Box 85, Boyce, VA 22620.

Second Annual Menninger Flowering Tree Conference, Quality Inn, Cypress Gardens, Winter Haven, FL, **May 14-15.** Contact Mrs. Taylor Burris, P.O. Box 16796, Temple Terrace, FL 33687, 813/985-8511.

Western ISA chapter meeting, Sacramento Inn, Sacramento, CA, **May 17-20.** Contact Ervin C. Bundy, ISA Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/328-2832.

Kentucky Cemetary Association annual meeting, Executive Inn, Louisville, KY, **June 5-7.** Contact Lewis C. Tingley, Resthaven Memorial Park, P.O. Box 18068, Louisville, KY 40218, 502/491-5950.

Grow Show '81, Albert Thomas Convention Center, Houston, TX, **June 8-10.** Contact David H. Lindsay, Exposition Manager, P.O. Box 17413, Dulles International Airport, Washington, DC 20041, 703/471-5761.

Texas ISA chapter meeting, Dunfey Dallas Hotel, Dallas, TX, **June 11-13.** Contact Ervin C. Bundy, Executive Director, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801, 217/328-2032.

New York State Nurseryman's Association Convention and Trade Show, Onondaga County War Memorial Convention Center, Syracuse, NY, **July 7-10.** Contact Margaret Herbst, 230 Park Ave., New York, NY 10017, 212/685-4579.

American Sod Producers Association Summer Convention & Field Days, Hershey Motor Lodge & Convention Center, Hershey, PA, **July 15-17.** Contact ASPA, Bob Garey, Executive Director 9th & Minnesota, Hastings, NE 68901, 402/463-4683.

International Society of Arboriculture Annual Meeting, **Aug. 9-13,** Boyne Mountain Resort, Boyne Falls, Michigan. Contact E.C. Bundy, 5 Lincoln Square, P.O. Box 71, Urbana, IL, 61801, 217/328-2832.

Sixth Nebraska Turfgrass Field Day and Equipment Show, Aug. 4. Contact Dr. Robert Shearman, University of Nebraska, 377 Plant Science Bldg., Lincoln, NE 68583, 402/472-2550.

University of Rhode Island Turfgrass Field Day, Kingston, RI, **Aug. 26.** Contact C.R. Skogley, University of Rhode Island, Dept. of Plant Science, Woodward Hall, Kingston, RI, 02881, 401/792-2570.

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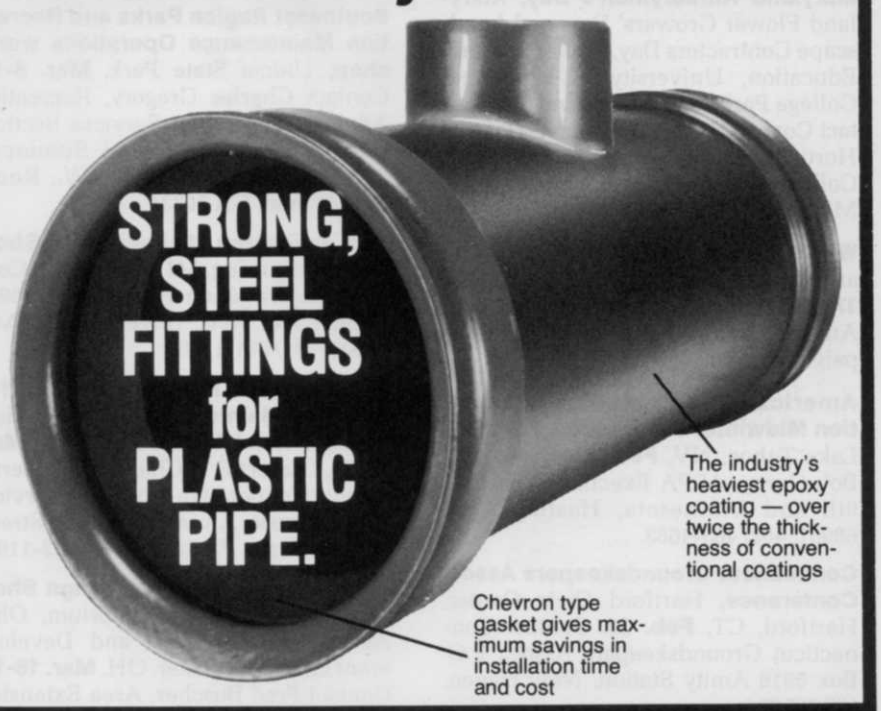

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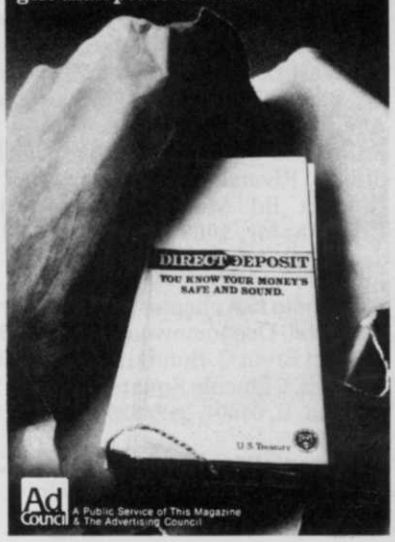

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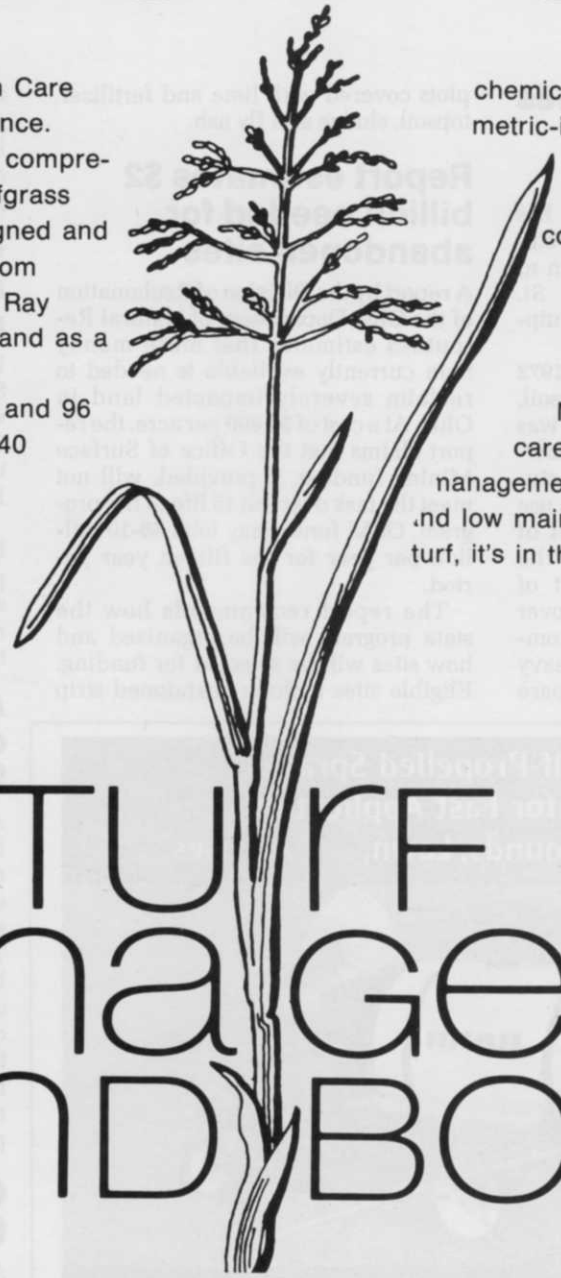
Finally, An Aid For Teaching Turfgrass

Superintendents, Contractors, Lawn Care Managers, New, On-the-Job Reference.
The Turf Managers' Handbook is a comprehensive, organized approach to turfgrass science and care. It has been designed and written by leading turf specialists from Purdue, Dr. William Daniel and Dr. Ray Freeborg, for on-the-job reference and as a text for students.
The book contains 150 illustrations and 96 color photographs. Data includes 240 tables and forms. Included are specifications for rootzones, employment, calculations for chemical applications, and extensive metric-imperial conversion. Business and technical aspects of turfgrass management are covered in this 424-page book. Planning, purchasing, hiring, construction, and plant selection are put together for easy on-the-job reference. Markets covered include lawn care, sod production, golf course management, cemeteries, athletic fields, and low maintenance areas. If it concerns turf, it's in the Turf Managers' Handbook.



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HBJ

The Land Reclamation Report

Old strip mine becomes classroom for Ohio school

An abandoned 50-acre strip mine has become a place for more than 100 students in mining and reclamation at Belmont Technical College, in St. Clairsville, Ohio, to study heavy equipment and reclamation technology.

The mine, stripped prior to the 1972 Ohio law, has sheer walls, no topsoil, and many pond areas. The land was purchased from R&F Coal Co. Following reclamation performed by the students, the area will revert to public use for hunting and fishing. A grant of $240,000 has been provided for the project by the Ohio Department of Natural Resources and should cover nearly 75 percent of the cost. Coal companies are lending the students heavy equipment. Students hope to compare plots covered with lime and fertilizer, topsoil, sludge and fly ash.

Report estimates $2 billion needed for abandoned sites

A report by the Division of Reclamation of the Ohio Department of Natural Resources estimates that more money than currently available is needed to reclaim severely impacted land in Ohio. At a cost of $8,000 per acre, the report claims that the Office of Surface Mining funding, if provided, will not meet the task over the 15 life of the program. OSM funds may total $8-10 million per year for the fifteen year period.

The report recommends how the state program will be organized and how sites will be selected for funding. Eligible sites include abandoned strip mined land, open mine shafts, underground mine openings, mine-related landslides on public and private property, and research and demonstration projects.

OSM enforcement authority clarified in new rules

Final rules clarifying the Office of Surface Mining's authority to enforce violations by coal mine operators of the Surface Mining Control and Reclamation Act of 1977 were published in the Federal Register on October 10.

An earlier decision by the Interior Department's Board of Appeals appeared to restrict OSM's enforcement authority. The new rules eliminated confusing language and replaced sanction authority.

Alabama small operators get $2.5 million in aid

A grant from the OSM will provide funds to consulting firms and laboratories to make it easier for small mine operators to obtain the data needed for surface mining permits in Alabama. The cost of such data was thought to be beyond the means of the large number of small operators in the state. Small operators are defined as producing less than 100,000 tons of coal per year. Data required by the Surface Mining Act is needed before operators can receive permits to mine.

Ore waste reclamation faces Minnesota test

A $170,000 grant from the Interior Department's Bureau of Mines has been awarded to Barr Engineering Co., Minneapolis, to observe the survival of ten plant species on tailings from ore processing.

Release of toxic elements and the effect of weathering on the tailings will also be observed.

Tailings disposal is a major concern in the Iron Belt area of Minnesota and now there is great demand for mining copper and nickel in the area. The success and cost of the reclamation will greatly effect future mining in the area.

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PRODUCTS

Skid steer loader model 11C can handle 1150 pounds and won't tip with 2300 pounds. A 30-hp. diesel, water-

cooled engine powers it. Standard features include hydrostatic all-gear drive system, heavy-duty frame, and front protector gates. It also features the Hydra-Mac, Inc. hydra-lever control system for easy operation and increased canopy width and reduced noise level for operator comfort.

Write No. 701 on reader service card

Railroad rights-of way can be kept free of certain annual grasses and broadleaf weeds with a newly registered tank mix of herbicides from Ciba-Geigy Corp. It includes Ontrack 8E plus Atratol 80W plus Princep in the 80W, 4L, or Caliber 90 formulations. The herbicides control barnyardgrass, crabgrass, dogbane, fall panicum, giant foxtail, kochia, little barley, pigweed, ragweed, ripgut brome, Russian thistle, ryegrass, sprangletop, volunteer wheat, wild oats, and witchgrass.

Write No. 702 on reader service card

The Bolens FS-11 frame-steer riding mower can trim around trees, zig-zag between bushes, and make tight "square" turns next to sidewalks and driveways. The center-pivoting, full-frame steering lets the operator make sharper, tighter angle turns, which allows close trimming without jockeying back and forth.

An 11-hp. Briggs & Stratton engine powers it. Other features include electric start, rugged 5-speed transmission, a big front-mounted 40-inch mower deck, foam-padded adjustable seat,

16-inch pneumatic tires, and a totally enclosed engine for a quiet ride. FMC Corp. makes it.

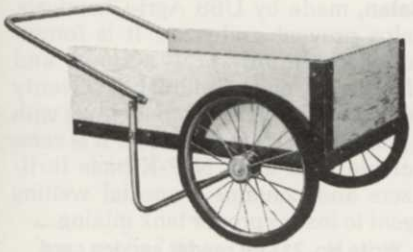
Write No. 703 on reader service card

Western Products introduces the SnowKing snowplow for two-wheel drive trucks and light commercial plowing. A 12 gauge, 7-foot steel blade rolls the snow ahead and off to the side. Five vertical ribs and a reversible cutting edge bolted along the bottom

reinforces the blade. Two trip springs on the back allow the blade to "trip" forward and ride over obstacles without damaging the plow or vehicle.

Write No. 704 on reader service card

The TCK-42 trailer cart kit from Precision Products, Inc. assembles in a few simple steps into a sturdy trailer cart for



riding mowers and small tractors. The cart has a 15-cubic foot capacity or approximately 500 pounds. All hardware is included; it is usable with ⅝ or ¾-inch plywood.

Write No. 705 on reader service card

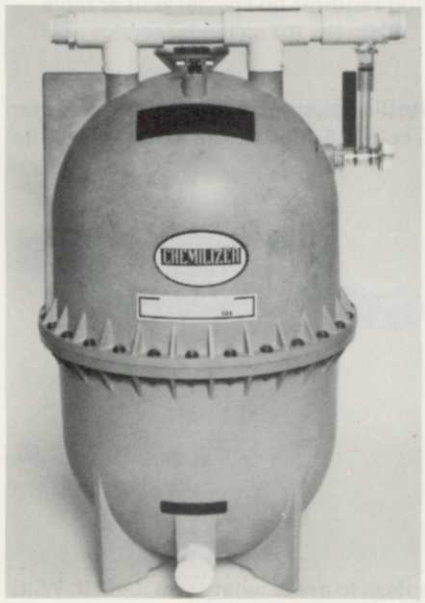
The DH7 trencher, powered by a JI Case-built 3859 cm³ (219 in³) 4-cylinder, liquid-cooled diesel engine with 54 kW (72 hp.) is designed for underground

applications throughout the year in all digging conditions.

Hydrostatic trencher drive permits variable digging chain speeds plus reverse chain capability and allows the engine to continually operate at optimum rpm. Chainline speed can be reduced or increased to match digging conditions without varying engine rpm. Two separate hydrostatic systems power the DH7—one for the ground drive and the other for the attachments.

Write No. 706 on reader service card

A lawn fertilizing device, a redesigned version of the Chemilizer, has been in-



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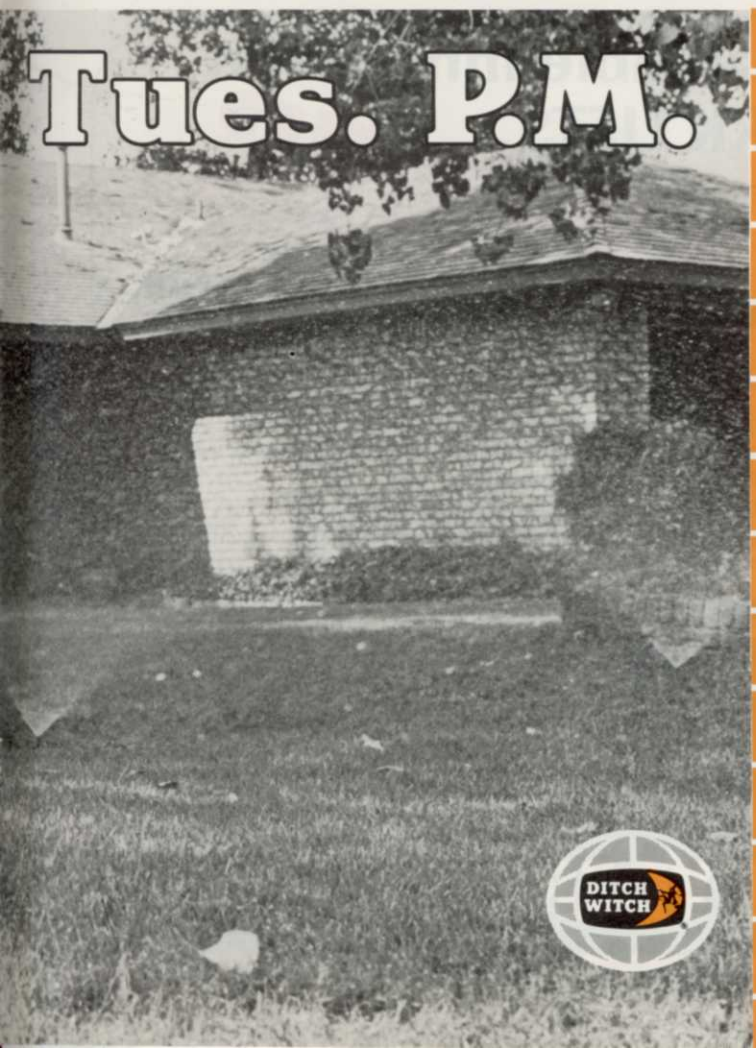

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troduced by Chemilizer Products, Inc. It is a liquid injector which can be connected to the water supply for underground or above-ground hose sprinklers. A small, round container with standard hose fittings, it can be moved easily to different locations. Installation requires no special skill or tools.

Write No. 707 on reader service card

Anti-backsplash sprinkler, Weather Tec's 15-50, directs undesireable

splash to areas where you need it. With no backsplash you eliminate the problem of slippery sidewalks, discolored fences, and water stained windows. The stainless steel spindle is corrosion free, giving long life and trouble free operation.

Write No. 708 on reader service card

An interior watering system, The Water Machine, saves maintenance hours, reduces staff fatigue, and increases employee productivity. It is clean and quiet, using pressure instead of pumps, motors, or batteries. This eliminates clogging, breakage, and leaks. Two models are available, the WM-8 with flow rate of 4 to 6 gpm, and the WM-18, with a flow rate of 6 to 8 gpm. They hold 8.5 and 18 gallons, respectively. Cascade Designs, Inc. is the manufacturer.

Write No. 709 on reader service card

A 16-hp. lawn tractor, the 5116 Special, features a longer wheelbase, wider stance, and wider tread tires than any other Simplicity Manufacturing tractor. The deep-deck mower is supported by full width rollers at the rear, and pivots with the front axle to follow ground contours. This gives a more uniform cut and reduces the chance of

scalping. A quiet-running, twin-cylinder Briggs & Stratton engine and a 42-inch wide three-bladed mower are standard.

Write No. 710 on reader service card

USS Vertagreen 10% Concentrated Balan, made by USS Agri-Chemicals, helps prevent crabgrass. It is formulated for liquid-spray systems and offered as a dry material. Twenty pounds will treat one acre of lawn with 2 pounds of active herbicide. It is compatible with most N-P-K base fertilizers and contains a special wetting agent to insure proper tank mixing.

Write No. 711 on reader service card

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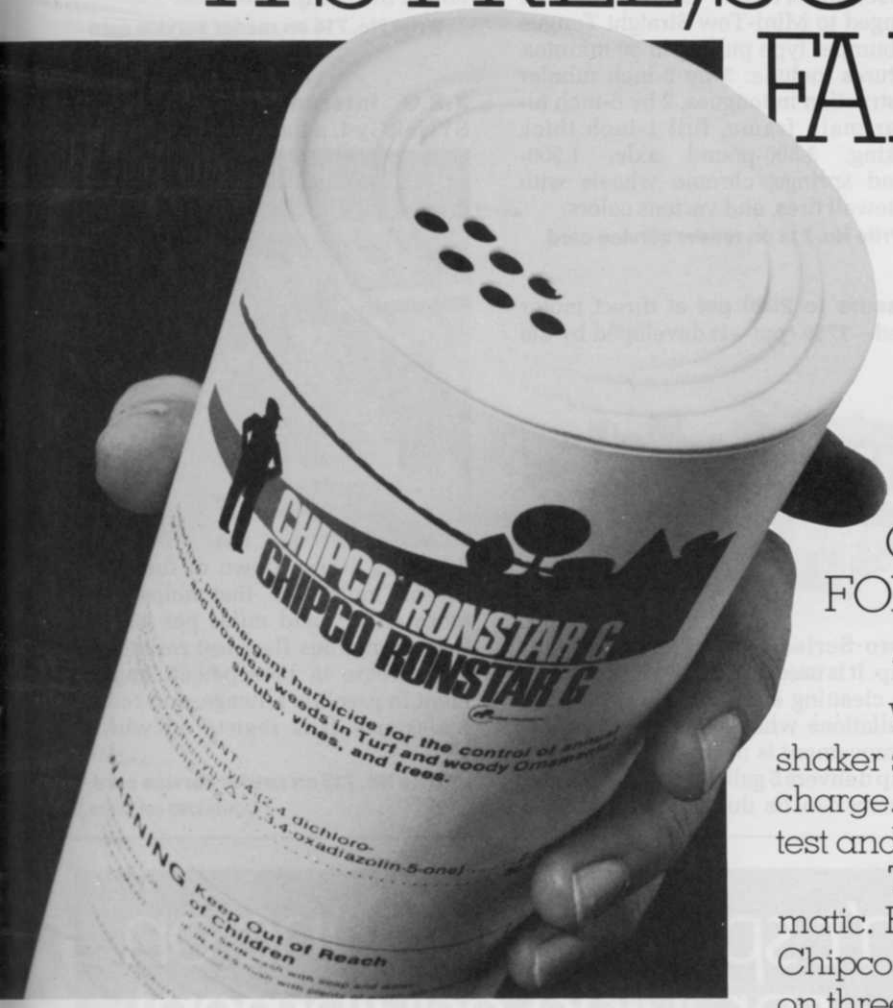

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And then, if you like the idea of getting excellent, long-lasting crabgrass control with a herbicide that's so versatile it's foolproof, you won't mind paying for your next batch of Chipco Ronstar G. Fair enough? Rhône Poulenc Chemical Co., Agrochemical Div., Rhône Poulenc Inc., Monmouth Junction, NJ 08852. RHÔNE-POULENC

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Lightweight snow throwers from Toro comprise the company's line of single-stage machines. At far right is the

Power Shovel, which weighs less than 12 pounds. Others from left to right are: S-200 with electric start, the S-200 with manual start, and the S-140, all with gasoline engines, and also the cord electric S-120.

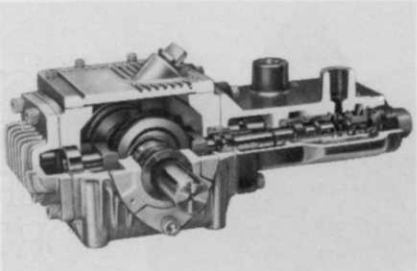
Write No. 712 on reader service card

Hauling with compact pickups can be done efficiently with equipment from

Handy Mandy Trailer Mfg. Co. The Gooseneck Tongue (shown) can be changed to Mini-Tow Straight Tongue for bumper type pulling in 30 minutes. Features include: 3 by 5-inch tubular construction in tongues, 2 by 6-inch tubular main frame, full 1-inch thick decking, 3,500-pound axle, 1,500-pound springs, chrome wheels with whitewall tires, and various colors.

Write No. 713 on reader service card

Pressure to 2000 psi at direct motor speed—1750 rpm—is developed by the



Hypro Series 2100 Triplex plunger pump. It is used as a component in pressure cleaning equipment and in other installations where high pressure liquid movement is needed. The plunger pump delivers 5 gallons per minute, but capacity can be doubled by adding a second cylinder head to the opposite end of the pump crankcase.

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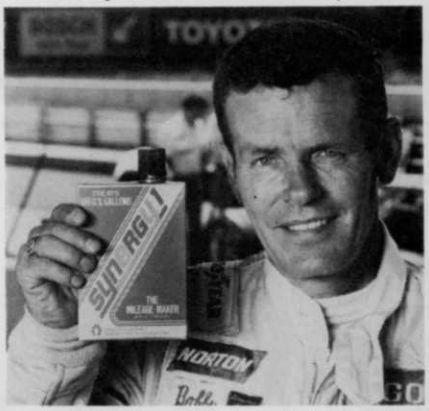
X.R.G. International is marketing SYNeRGy 1, a formula of catalysts that



produces a breakdown of fuel hydrocarbon molecules, that helps extract more energy and miles per gallon of fuel. Numerous fleet test results show an increase in horsepower, improvement in gasoline mileage, and reduced emissions. It is registered with the EPA.

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Continues on page 68

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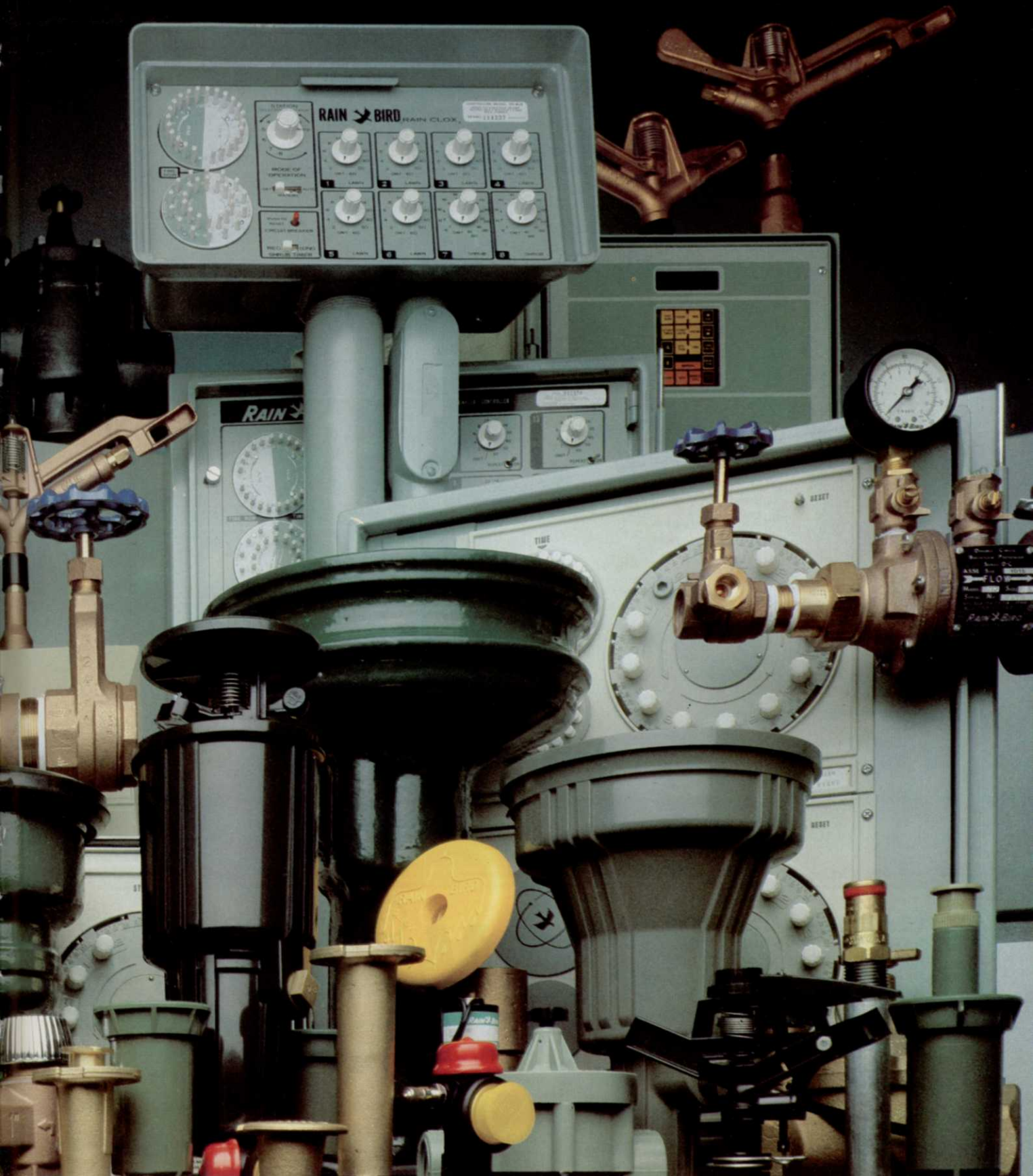

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Get on stream with NELSON'S N.E.W. program in '81

L.R. Nelson Corporation's N.E.W. program is designed to make your '81 season the best ever.

New Expansive Warehouses
N.E.W. enlarged, modern distribution centers in the west and southwest will provide you greater service and availability of Nelson Landscape and Turf products.

Newer Economical Watering
N.E.W. products, featuring N.E.W. rotors, pop-up sprays, and controllers makes for one of the most complete lines in the industry; products designed with you in mind; reliable products that are easy to install and maintain.

Nelson Early Winter
Nelson Easy Winner
N.E.W. programs. The Nelson Early Winter and the Nelson Easy Winner programs are all part of Nelson's N.E.W. program to help you generate additional sales.

Nelson Easy Warranty
N.E.W. Policy. As an indication of how confident we are of the dependability of Nelson Landscape and Turf equipment, we've introduced the Nelson Easy Warranty policy; a N.E.W. policy that backs the entire product line.

Nelson's program for '81 is designed with you in mind!

Nelson
Ends
Worry

NELSON®

L. R. NELSON CORPORATION
PEORIA, ILLINOIS 61615

Write 154 on reader service card

A 4-post roll over protection structure (ROPS), designed to help protect the operator in case of roll-over, is one of several accessories offered with the Cushman Front Line tractor recently introduced. It is now available with a

60-inch mowing deck and several other accessories, including a snow thrower, multi-purpose brush, and cab set.

Write No. 716 on reader service card

Allied Chemical Corp.'s Agricultural Group offers a chelated nitrogen-iron

liquid fertilizer for foliar application. Called NFE, it has an analysis of 16 percent nitrogen and 4 percent iron to aid plants which cannot efficiently use available iron in the soil.

Write No. 717 on reader service card

Garden planter/transplanter, model 350, from Ellis Mfg. Co., Inc. can be used with a 10-hp garden tractor to plant bare-rooted stock, potted plants, seedlings, bulbs, seeds, and nursery stock. Advantages over hand planting

include uniformity, less shock and damage to plants, even watering to root of plant, uniform depth, and speed.

Write No. 718 on reader service card

Ransomes Inc. (formerly Wisconsin Marine, Inc.) has introduced a line of snow throwers with a heavy-duty tractor-type transmission with all-steel gears. A simplified control single lever with inline shifting controls all forward

and reverse speeds without clutching. A rugged impeller rather than a fan discharges snow, which prevents plugging of the discharge chute.

Write No. 719 on reader service card

Embark plant growth regulator reduces the cost of maintenance in locations such as highway rights-of-way, airports, golf course ditchbanks, park and recreation areas, cemeteries, and school districts. It can provide 8 to 10 weeks of growth suppression in some parts of the country (north), and two applications can control plants for a whole season. 3M Co. makes it.

Write No. 720 on reader service card

A plastic cylinder called Sav A Tree fits around the base of young trees to protect them from lawnmower gouges, damage by children, and teeth bites from small, hungry animals. A circular

Continues on page 70

Does your turf make your reputation good as gold?

It does if it's seeded with Pennfine Perennial Ryegrass. Since its development by Penn State University in 1970, Pennfine has become the number one selling fine-leafed perennial ryegrass in the nation. And the thousands of turf professionals who continue using Pennfine are the biggest vote of confidence. You'll find top-quality Pennfine competitively priced and in ready supply. Pennfine Perennial Ryegrass, P.O. Box 923, Minneapolis, MN 55440

Write **145** on reader service card

Write **104** on reader service card

ORTHENE–INSECT PROTECTION AT ITS BEST.

ORTHENE® Tree & Ornamental Spray is a giant step forward in protection. It kills a wide range of insects, on contact and with a lasting residual action. In fact, it's probably the only insecticide you need.

Here are some of the insects it kills; aphids, bagworms, birch leafminer, tent caterpillar, Douglas Fir tussock moth larvae, gypsy moth larvae, webworms, scales, California oakworm, spring and fall cankerworms, Nantucket pine tip moth larvae, and adult root weevil.

NEW FROM ORTHO

A companion product from ORTHO is ORTHOMITE™ Ornamental Miticide. It's the perfect solution for mite problems on flowers and ornamentals.

AVOID ACCIDENTS: For safety, read the entire label including precautionary statements. Use all chemicals only as directed.

FOR PROFESSIONAL USE
ORTHOPRO

Chevron
ORTHO
Chevron Chemical Company

TM's. ORTHO, CHEVRON, CHEVRON DESIGN, ORTHENE – REG. U.S. PAT. & T.M. OFF.

Please send me more information on ORTHENE.

Name _____

Company _____

Street Address _____

City _____ State _____ Zip _____

Mail to: R. G. Gras, Chevron Chemical Company, 575 Market Street, San Francisco, California 94105

base secures the cylinder to the ground and serves as the foundation. Sav A Tree, manufactured by Mo-Ark-Mold, assembles easily and is anchored into the ground by two hollow spikes. The base collects water and fertilizer, which seeps into the ground through hollow pegs.

Write No. 721 on reader service card

Small offset tractor with engine mounted to one side provides operators with good visibility for cultivating nursery seedlings, doing park and grounds maintenance, and other jobs. It accommodates a wide range of implements and has a 540 rpm transmission driven PTO. A 30-hp., 99 cubic-inch, three-cylinder, water-cooled diesel engine powers this model 274 from International Harvester.

The machine uses a sliding spur-gear transmission with eight speeds forward and two reverse. A category 1, three-point hitch provides full position control and return to selected depth. A 5.7 gpm pump provides the pressure for all hydraulics.

Write No. 722 on reader service card

Two rotary mowers, the Lawnfilte Professionals from MTD Products Inc., come with a 4-hp. Tecumseh XL engine with sealed solid-state ignition and double-protection, fine-filtration air

cleaner. Both mowers carry long sealed bearings, reinforced lower handle supports, rugged throttle, large capacity gas tank (1.2 gallon) with gauge cap, and easy-rolling 8-inch steel wheels with thick-wall tires.

Model 618 (left), a side-discharge 20-inch mower, has a cast aluminum deck that won't dent, rust, or corrode. Model 7638 (right) cuts a 22-inch rear swath and discharges from the rear. A powerful vacuum lifts the grass blades and collects clippings in a 2½ bushel grasscatcher.

Write No. 723 on reader service card

Does your turf's appearance make you feel blue?

Then it's time you started using Pennfine Perennial Ryegrass. Pennfine has proved itself for nearly a decade with the toughest customers of all: Thousands of turf pros all across the nation. It's used consistently on many of the nation's most prestigious turf areas. It should be on yours as well. Pennfine, the best-selling fine-leafed perennial ryegrass available. Pennfine Perennial Ryegrass, P.O. Box 923, Minneapolis, MN 55440

Write **146** on reader service card

Miracle-Gro spikes for trees provide trees and large shrubs with necessary nutrients in an easy-to-use form. One

application of the concentrated 10-20-10 formula with iron and zinc is usually sufficient for one year. Stern's Garden Products, Inc. makes Miracle-Gro and packages it in a box with six spikes.

Write No. 724 on reader service card

Our new Two-Year Warranty says a lot about our IC4 Controller.

We wouldn't offer a new Two-Year Full Over-the-Counter Exchange Warranty if we weren't totally confident about our IC4 four-station controller.

It's just as reliable as it is precise, thanks to a new silicon chip built into a new circuit board.

The IC4 is also easy to program. Its twelve key pad is so simple to understand, it virtually explains itself. (In fact, many homeowners don't even *need* the instruction sheet.)

Installation is a snap—just hang the IC4 up and attach the wires to its built-in terminal strips.

You see, our Concept of Irrigation means building a controller that's going to give you peace of mind.

And just to make sure, we give you a little piece of paper along with it.

Our new warranty.

We've re-invented irrigation, from the ground up.

TORO®
Irrigation Division

The Toro 2-Year Full Warranty for the IC-4 Controller.

The Toro Company warrants, to the owner, each IC-4 Solid State Controller with a Two-Year Full Over-The-Counter Exchange Warranty against defects in material and workmanship for two years from the date of original purchase by the owner.

During such warranty period, Toro will replace any IC-4 Controller found to be defective.

This warranty extends only to the TORO IC-4 Solid State Controller. Toro is not liable for failure of products not manufactured by it even though such products may be sold or used in conjunction with Toro products.

Return the defective product to your local Toro distributor, who may be listed in your telephone directory Yellow Pages under "Sprinkler Systems" or "Irrigation Supplies," or contact Customer Services Department at The Toro Company, P.O. Box 489, Riverside, California, 92502, phone (714) 688-9252, for the location of your nearest Toro distributor. Toro's liability is limited solely to the replacement of the defective IC-4 Controller. There are no other express warranties.

This warranty does not apply where equipment is used or installation performed, in any manner contrary to Toro's specifications and instructions, nor where equipment is altered or modified.

Toro is not liable for indirect, incidental or consequential damages in connection with the use of equipment, including but not limited to vegetation loss, the cost of substitute equipment or services required during periods of malfunction or resulting non-use, property damage or personal injury resulting from installer's negligence.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

TORO
Irrigation Division

Write **150** on reader service card

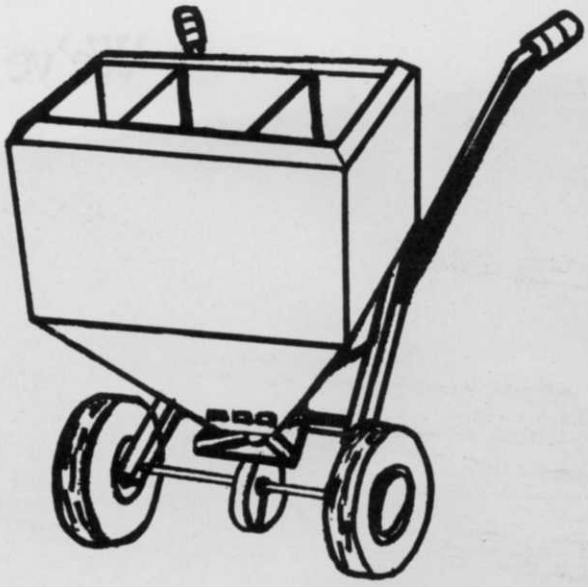
$50 COMBINE CONVERSION DEVICE* $50

CONVERT YOUR BROADCAST SPREADER TO A COMBINE CAPABLE OF APPLYING 3 DIFFERENT GRANULAR MATERIALS AT ONE TIME.

1. NO MORE HAND MIXING MATERIALS
2. NO MORE USING EXPENSIVE PRE-MIXES
3. NO MORE $15,000 OR MORE SPRAY TRUCKS
4. NO MORE EXPENSIVE COMBINES
5. NO MORE HUGE EQUIPMENT EXPENSES TO SERVICE MORE CUSTOMERS
6. NO MORE 2 OR 3 TIMES AROUND THE SAME AREA GETTING DIZZY

HERE IS THE ANSWER YOU HAVE BEEN WAITING FOR, 1 TIME AROUND DOES IT.

Norman Lynd, owner of **Green Thumb Lawn Service,** located in Willow Grove, PA., has invented and is now manufacturing this conversion device* that will change a broadcast spreader into a combine, without spending thousands of dollars.



A. Installation takes approximately one hour and you don't have to be a mechanic.
B. Once installed, it can be removed in less than one minute for cleaning and put back together in one minute.
C. Installation instructions and directions are included.
D. The unit is made with rugged **stainless steel** and **aluminum.** (No rusting)
E. All nuts and bolts for assembly are stainless steel.
F. Because of the simplicity and ruggedness of this unit, it should never need replacement.
G. Three adjustable metering slides for calibration are the only moving parts.
H. A common ruler is used for calibration settings
I. Please allow **three weeks for delivery.**
J. At this time, insert devices are available for **cyclone brand spreaders model #99-100** and **100B** only. If you want them for other types of spreaders, please send us MANUFACTURERS NAME, MODEL # of spreader and YOUR ORDER. Please allow **6 WEEKS FOR DELIVERY.**
K. These units are not available from any other source at this time.
L. Payment in full must accompany all orders before shipment is made.
M. We will ship all orders via UPS in U.S.A. unless otherwise specified.
N. Total price **$50.00** per unit plus **$5.00** per unit for shipping and handling.

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TELEPHONE 215-657-6200

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Anywhere in U.S.A. Except PA.

800-523-2530

Write **114** on reader service card

Stop polluting your lawn

Learn turf care the natural way

More than 10,000 people have learned lawn care and grounds maintenance from Don Arenberg, one of the country's leading agronomists. Find out why by attending one of his three-day clinics.

The Arenberg **Nature's Touch** Clinic can help you make your property look better with fewer treatments, reduced chemical costs and less mowing, maintenance and watering.

This no-nonsense clinic is unlike any university seminar you ever attended. There is no complicated theory, no technical language. Just practical, every-day specifics that you can start using immediately to improve your grounds or to make more money.

Don Arenberg

LEARN ABOUT THESE TOPICS

Natural growth rhythm of plants.

Man's method of cultivating plants.

How soils work.

How nutrients build plants—and kill them.

How soil and plant stresses weaken plants.

Soil life support systems.

Methods of relieving soil stress, compaction and nutrient deficiency.

Natural methods of rebuilding soil productivity.

How to develop healthy, beautiful lawns.

Tree and shrub care.

Weed control and prevention.

Proper application techniques.

Answers to your own specific problems.

USE THE NATURAL METHOD

Don Arenberg has spent a lifetime developing an approach to lawn care that avoids harsh chemicals that kill essential microbes and restrict the flow of air, water and nutrients into the soil.

His **Nature's Touch** approach results in a richer, lusher lawn that resists insects and diseases, withstands stresses and eliminates the need for power raking and aerifying. Eventually, you can even mow and water less, thanks to the increased health of the lawn.

MEET A PIONEER

Don Arenberg is a nationally known and respected agonomist. He received his degree in agronomy from Purdue University and spent years in research labs learning how soil works and grass grows.

He has served as a consultant to many of the nation's largest companies in the area of turf grass and grounds management.

NOTE THIS GUARANTEE

If you are not completely satisfied with your results after having followed the **Nature's Touch** recommendations learned at this clinic, Don will refund the clinic fee. That's right. A 100 percent satisfaction guarantee! Can anything be fairer than that?

ACT TODAY

The clinic runs 8:30 - 5:30 daily, so get set for three big, fact-filled days. Fill out the coupon below, and return it along with your check or money order. Enrollment is limited, so don't delay.

Consulting Agronomists
11150 West Addison **312/455-8600**
Franklin Park, IL 60131

nature's touch

Tear off coupon and mail today with your remittance.
Keep information above for your calendar.

Yes, Don, I want to learn to improve my turf the natural way. Sign me up for your three-day **Nature's Touch** Clinic.
Please reserve _____ seats for me.

Name _____
Please print
Title or position _____

Organization _____

Address _____

City _____

State _____ Zip _____

Telephone _____
Use separate sheet for additional participants.

Check clinic you will attend:
- ☐ Feb. 3-5. For garden centers, lawn spraying services.
- ☐ Feb. 10-12. For golf courses.
- ☐ Feb. 17-19. For cemeteries, parks, athletic fields, hospitals, industrial grounds, sod farms, other commercial/institutional lawns.
- ☐ March 10-12. For garden centers, lawn spraying services.
- ☐ March 17-19. For cemeteries, parks, athletic fields, hospitals, industrial grounds, sod farms, other commercial/institutional lawns.

All sessions are 8:30 - 5:30, at the offices of Agro-Chem, Inc., 11150 West Addison, Franklin Park, Illinois.

Check your interests:
- ☐ Lawns
- ☐ Ornamentals
- ☐ Flowers
- ☐ Soil-rebuilding
- ☐ Natural fertilizers
- ☐ Other _____

Check one:
- ☐ Advanced registration. Price is $435 when check is enclosed with this registration form.
- ☐ Deferred payment. Price is $495 when paid at the door or billed. Admission subject to availability.

Fee includes lunches and snacks, text, surveying and problem-diagnosing material and equipment.

- ☐ Check here if you wish a room reserved at a nearby motel (room will be in your name and at your expense).
- ☐ Number of rooms needed
- ☐ One person ☐ Two persons per room.
- ☐ Single beds ☐ Double bed.

Details will be sent you.

Make check payable to Consulting Agronomists, Department WT, 11150 West Addison, Franklin Park, IL 60131. If you have any questions, call Don Arenberg at 312/455-8600.

CLASSIFIEDS

Rates: All classifications 70¢ a word. Box number, $5. All classified ads must be accompanied by check or money order covering full payment. Mail ad copy to: Dawn Anderson, WEEDS, TREES & TURF, 1 East First Street, Duluth, MN 55802.

When answering ads where box number only is given, please address as follows: Box number c/o WEEDS, TREES & TURF, Classified Ad Department, 120 West Second Street, Duluth, MN 55802.

HELP WANTED

Wanted: Experienced Nursery Manager, Landscape Architect and 3 Crew Foreman. Nursery Manager to run new 170 acre Nursery in New Lenox, Illinois and Landscape Architect to work in our Hickory Hills office. Crew Foreman to run landscape and nursery crews. Applicants must have good experience and references. Send resume to Teerling Landscaping, Inc., 7750 West 95th Street, Hickory Hills, Illinois 60457.

Sales Representatives. We have several positions open in New England selling tree care services. Strong sales with knowledge of arborculture required. Management ability desirable. Please write Paul Poirier, Bartlett Tree Experts, 240 Highland Ave., Seekonk, Mass. 02771.

Turf Farm General Manager to establish sod farm in Central Florida. I need a hands on manager who wants to work with minimum supervision. We are an established company in the horticultural field which is diversing into other segments of the green industry. Write WTT Box 260.

WANTED: Firewood Distributors for energy conservations company. Inventory investment range — $2000 to $10,000 — depending on location. Serious replies to: HOME FIREWOOD, P.O. Box 141 Sta. B., Hamilton, Ontario L8L 7O7 Canada.

Career opportunity in Pittsburgh. Chemical lawn care company desires Senior Applicator. Excellent salary, benefits and bonus with outstanding future. Turf experience necessary with excellent past employment history. Send resume to WTT Box 258.

HELP WANTED: GENERAL MANAGER: For a success oriented chemical lawn care firm in the Washington D.C. area. We are growing and need a take charge individual to lead the way. A thorough working knowledge of liquid & granular applications is required and at least (2) two years management experience. Send resume and salary history to: Dennis J. McNeil, Johnson Lawn Systems, Inc., 13760 Travilah Road, Rockville, Maryland 20850.

MANAGER needed for lawn care company in Houston, Texas. Must have sales experience and be aggressive. Long working hours all year. Turf knowledge is a must. Answer this ad ONLY if you feel you fit this description. Excellent salary, great benefits and best opportunity for advancement in the lawn care industry! Send resume and include present salary requirements and financial expectations for next 1,2,3,4,5 years. Write WTT Box 261.

IRRIGATION SUPERVISOR for established Connecticut irrigation contractor. Previous experience in installation and supervision of irrigation crews essential. Excellent opportunity to join a rapidly expanding company. Excellent salary and future for qualified person. Send complete resume and salary history to Mark Sosnowitz, Sprinklescape, P.O. Box 175, Glenville Station, Greenwich, Conn. 06830 (203) 869-4149.

FOR SALE

LAWN SPRAYING BUSINESS. Established Ohio liquid lawn care business for sale. 5000 accounts. Six figure selling price. Owner could assist buyer. Write WTT Box 255.

FOR SALE: Lawn maintenance business. Working partner or buyer wanted for $100,000 gross mowing operation. $10,000 minimum investment. Write WTT Box 256.

CLEVELAND AREA OPPORTUNITY — Landscape and lawn care business for sale. Turn key operation available with or without property and buildings. Sales exceeding one million annually. Terms available. Write WTT Box 254.

FOR SALE: Landscape Maintenance business. Move to Colorado and own one of Denver's largest landscape maintenance business. Well established for seven years, with unlimited growth potential. Write L.M.B. 7212 S. Costillo, Littleton, CO. 80120.

For Sale. 1976 GMC 6500 series lawn spray truck. Allison automatic transmission, 1500 gallon fiberglass tank, electric hosereel and hose, Meyer 200 6 gpm centrifugal pump. Will handle liquid or solids. Ideal for nurse truck as well as spray truck. Complete $10,500 or cab and chassis only $4,500. (312) 438-5161.

LANDSCAPING BUSINESS — suburb of Milwaukee, excellent reputation, trucks, equipment, year-round business, high potential. Grossing over $200,000. Owner wants to retire; can assist buyer; will finance. Bluemel's Landscaping, 4930 W. Loomis Rd., Greenfield, Wis., 53220, (414) 282-4220.

For Sale: Minneapolis Area Opportunity 50 year old quality Tree Service business available for $23,000 equipment price. ($150,000-$200,000 volume) (612) 937-9770.

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We prepare you to cash in on countless money-making opportunities in modern landscaping and show you how, by easy steps, to start your own business part or full time. You will learn latest developments in Modern Landscaping, including creative design—plant propagation—revolutionary new methods of growing in manufactured soils—practical soil testing—growth regulators—the low down on fertilizers—easy ways of plant identification—estimating and contracting. My unique home study course features easy to understand assignments with careful detailed illustrations. Certificate Awarded. May. I send FREE, and without obligation, my informative BOOKLET?

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ENSYLVA CREEPS WHILE YOU SLEEP

Ensylva is the creeping red fescue that really does creep. Not only while you sleep, but around the clock.

Past performances prove that it matches some of the bluegrasses in its ability to creep and outshines other fine fescues that are called "creepers."

Scientists and turf managers have learned that some creeping red fescues fail to creep or fill in open spots. But that's not true with Ensylva.

Under either intensive or minimum maintenance Ensylva normally is more aggressive and it more quickly heals scars and fills in open areas in the turf.

It's also a handsome grass which germinates rapidly. Only the ryegrasses germinate faster. That's one reason it is often used as a nursegrass for the various Kentucky bluegrasses.

Ensylva is also a low maintenance variety which doesn't require frequent mowing and it will hold its color even under conditions of low moisture and fertility.

Look into Ensylva. It's the top quality creeping red fescue you know will creep.

A Product of **INTERNATIONAL SEEDS, INC.**

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USED EQUIPMENT

BRUSH CHIPPERS, used Bean sprayers, Model 10 Vermeer stumpers, Hydro-Axs and bucket trucks. Lease or for sale. Large inventory available. Call or write P.C. Gould Sales Company, Plains Road, Essex, Conn. 06426. (203) 767-1636.

HI-RANGERS AERIAL BASKETS 65', 57', and 53'. Skyworkers aerial baskets 65', 50', 40'. Vermeer stump cutter 1560, 6. Vermeer tree spade 66, TS 44. Asplundh bucket and brush chippers. Bean sprayer, 9 ton trailer. Parkway Tree Service, 12026 W. Cherry, Wauwatosa, Wisc. 53226. (414) 257-1555.

HI-RANGER 45' mounted on 63 GMC Utility Truck. Excellent condition — Picture on Request. Call Toll-Free (303) 761-3052. 1408 W. Quincy Ave., Englewood, CO 80110.

AERIAL BUCKETS, call Aerial Hydraulic Equipment, Essex, Conn. (203) 767-1636 — For brush chippers, Vermeer stumpers, sprayers, Hydro-Ax's, log loaders available for immediate sale, call P.C. Gould Sales Company, Plains Road, Essex, Conn. 06426. (203) 767-1636.

FOR SALE: 78 inch Big John tree mover, serial 32 in good condition, original owner. Trees, Inc. (517) 627-9155.

1978 Princeton Sod Harvestor Self Propelled, Diesel, $28,000. Don Clark, 4206 51st St. E., Bradenton, Fla. (813) 322-1505.

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CHIPPER BOX complete with hydraulic cylinder — Excellent $850.00 phone (201) 922-9393.

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CHALLENGING CAREER — Above average pay. Two-year Associate in Applied Science degree in Golf Course Operations/Landscape Technology. Financial assistance available. Write Western Texas College, Snyder, TX 79549. (915) 573-8511.

WANTED TO BUY

WANTED TO BUY — USED BIG ROLL SOD CUTTER Write to WTT Box 259.

SEEDS

SOD QUALITY SEEDS: Adelphi, Glade, Cheri, Nugget, Merion, Fylking, Majestic, Baron & Touchdown bluegrasses, also fine fescues. Manhattan ryegrass. Custom mixing available. Michigan State Seed, Grand Ledge, Michigan 48837. Phone (517) 627-2164.

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WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15553 N. East Street, Lansing, Michigan 48906. Phone (517) 484-7726.

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More precise holes. More precise rolls.

Removes uniform cores up to 3" long

Shown with optional windrow.

Shown with optional core processor.

That's the Greensaire® difference.

Precision is the name of the game on the greens. When it comes to greens aeration, the name associated with precision has been the Ryan Greensaire aerator since 1958. The self-propelled Greensaire II for 1981 continues that tradition.

The tines of the Greensaire II cleanly penetrate the turf in an up-and-down motion, removing 36 cores—up to 3" long—from every square foot of turf. Yet the process is so precise that the holes it makes should not affect the true roll of a ball.

Powered by a tough 8-hp engine, the Greensaire II takes a full 24" swath and lets you aerate up to 8,000 square feet per hour. And, with four sizes of interchangeable tines, you can achieve precisely the amount of aeration your greens need.

What's more, by attaching the optional Core Processor, you can separate and collect the thatch, and return the soil as top dressing—all in one operation.

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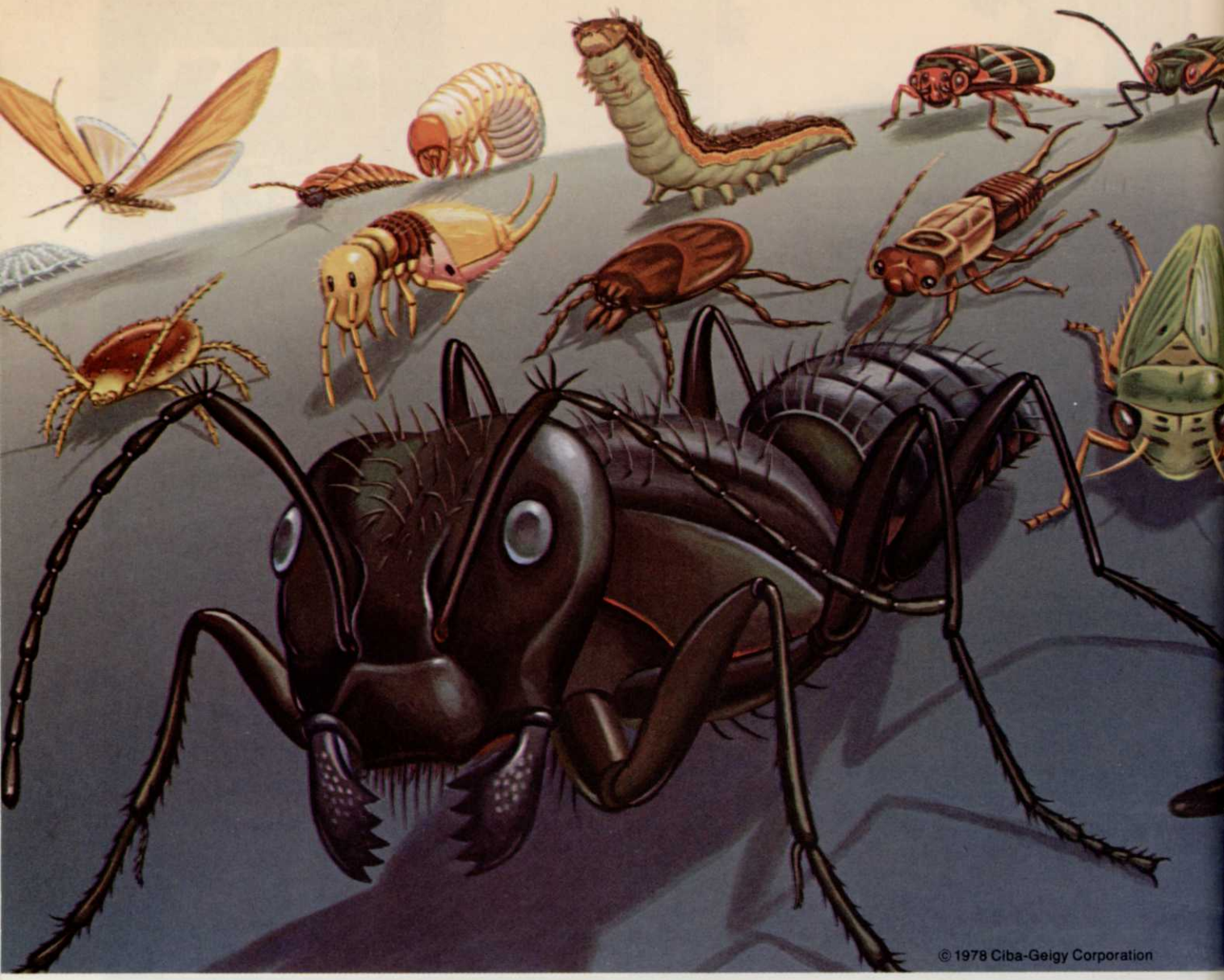

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"We chose to use Baron in our mix. And it's given us all we expected and more. We never expected this turf to be taking the abuse it is. Jogging, dancing, concerts, you name it. And since we maintain these grounds too, it's still up to us to keep it looking good. It's not easy under these adverse conditions, but it's a lot easier with Baron."

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